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EPA Superfund
Record of Decision:

SHURON INC.
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BARNWELL, SC
09/09/1998

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RECORD OF DECISION

SUMMARY OF REMEDIAL ALTERNATIVE SELECTION

SHURON SUPERFUND SITE

BARNWELL, BARNWELL COUNTY,
SOUTH CAROLINA

PREPARED BY:
U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION IV
ATLANTA, GEORGIA

DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

Shuron Superfund Site
Barnwell, Barnwell County, South Carolina

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the Shuron Superfund Site (the Site), located in Barnwell, Barnwell County, South Carolina, which was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), 42 U.S.C.ºº 9601 et seq., and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 C.F.R. Part 300 et seq. This record of decision is based on the administrative record for this Site.

The State of South Carolina concurs with the selected remedy, but does not concur with the remedial goal for lead, which is based on an assumed future industrial land use.

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response action selected in this record of decision (ROD), may present an imminent and substantial endangerment to public health, welfare, or the environment.

DESCRIPTION OF THE SELECTED REMEDY

This remedial action addresses surface and subsurface soil, sediment, and groundwater contamination.

The major components of the selected remedy for groundwater and soil are:

The remedy for the soil includes:

Excavation of contaminated soils; including surface and subsurface soils, and sediments, that exceed Remedial Goals, excluding a limited area of sediments in the Eastern Wetlands portion of the site (approximately 13 acres). This will be followed by wetlands restoration. The following will then apply:

- All soils will be either aggressively treated using solidification/stabilization (S/S) and aeration and left on-site or disposed off-site at an appropriate hazardous waste facility. This will be determined from Treatability Studies.

- Based on the results of the Treatability Studies, the following will apply:

    < Soils which cannot be treated to below RCRA hazardous levels will be disposed off-site.

    < Soils which can be treated such that contaminants do not leach above drinking water standards will be either treated and placed on- site under an engineered cap or disposed off-site at an appropriate disposal facility.

    < Soils which leach above drinking water standards, but below RCRA hazardous

levels, will be either treated and placed into an on-site Subtitle D landfill or disposed off-site at an appropriate disposal facility.

The remedy for the groundwater includes:

- Temporary groundwater extraction to accomplish dewatering of soils during source removal, and for an additional four to six months after excavation.

- Data collection/aquifer evaluation.

- Active Groundwater Treatment (Pump & Treat, Air-sparging, Re-circulation wells or any combination of the three) of remaining (after dewatering) contaminated groundwater.

- If determined to be applicable, Monitored Natural Attenuation may be applied to the appropriate portions of the contaminated groundwater plume.

Additional work during the remedial design phase

- The collection of additional soil samples from around the wastewater lagoons and solids ponds, and other uplands areas; additional surface and subsurface soils and sediment/surface water samples from the southern wetlands (and southeast corner), to further fill in data gaps.

- Annual sampling of nearby municipal well at drinking-water quantitation limits sufficient to quantify one (1) part per billion, until EPA designates otherwise.

- Collection of additional groundwater samples from existing and new wells (especially in the Southern Wetlands, including south and southeast of the Solids Lagoons to the South Drainage Ditch) to more fully delineate the extent of contamination.

- Site monitoring on a quarterly basis, to include water level measurements and Analysis of groundwater for parameters described in Section 9 of this ROD, from existing and new wells until the evaluation period is complete. Quarterly analysis of groundwater shall begin prior to any source removal, and continue until the completion of the evaluation period.

- Appropriate laboratory and field pilot test treatability studies for S/S, to determine the most effective reagent mixture for preventing the leaching of contaminants above drinking water standards, from soil to groundwater and to treat the organics and metals.

STATUTORY DETERMINATIONS

The selected, remedy is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost effective. This remedy utilizes permanent solutions to the maximum extent practicable and satisfies the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element for this Site.

Since selection of this remedy will result in contaminated groundwater remaining on-site above health-based levels until the remedial action is complete, and because the remedy may allow material which could leach contaminants above drinking water standards (based on leaching tests) to be contained (after treatment) in an on-site RCRA Subtitle D landfill, statutory five (5) year reviews will be performed after commencement of the remedial action to insure that the remedy continues to provide adequate protection of human health and the environment.

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SHURON SUPERFUND SITE
BARNWELL, BARNWELL COUNTY, SOUTH CAROLINA

1.0 SITE LOCATION AND DESCRIPTION

The Shuron Site is located at 100 Clinton Street in Barnwell, Barnwell County, South Carolina. Figure 1 presents a site location map. Throughout this document, the entire 85-acre parcel will be referred to as "the Site." One main building (about 185,000 square feet) is located on an approximate 34-acre parcel of land surrounded by a fence. Approximately one third of the 34-acre facility is paved or occupied by the main plant building. The remainder of the property consists of approximately 51 acres and is predominantly wetlands. The fence was partially extended to enclose a portion of the 51 acres in 1996. A removal action inside the building was completed by US EPA Region 4 Emergency Response and Removal Branch in 1994, in which drums of hazardous material left inside the building were removed.

The Shuron Site is bounded by residential properties immediately northwest and north-northeast, wetlands and Turkey Creek to the east, wetlands and a railroad right-of-way to the south, and Clinton Street to the west. The nearest known water supply well is the continuously-operating City of Barnwell Well No. 10, located on the west side of Clinton Street approximately 375 feet west of the southwest corner of the Shuron plant building. The first screened interval is 180 feet below land surface.

2.0 SITE HISTORY AND ENFORCEMENT ACTIVITIES

The former Shuron Site was constructed and placed into operation in 1958 as Shuron Continental Optical Company, a former division of Textron Inc. The facility manufactured single and multi-vision ocular lenses until 1991 (though the company was sold by Textron in 1985). The manufacturing process involved grinding and shaping of lenses using such material as aluminum oxide and garnet, followed by polishing, with oxides containing materials such as iron, cerium, and zirconium. Wastewater from the process was discharged to a series of four Wastewater Settling Lagoons immediately east of the building, the sediment from which was periodically transferred to two Solids Ponds located immediately south of the four Wastewater Settling Lagoons. Facility operations produced about 270,000 gallons per day (gpd) of wastewater containing the fine-grained grinding and polishing compounds, which contained lead, solvents, and waste oils. It is believed that a solvent (tetrachloroethene) was used to clean the lenses after the grinding and polishing process.

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There were several environmental investigations conducted at the facility during the period from 1982 to 1993. Groundwater sampling and analysis conducted by Westinghouse Environmental Services, Inc. (WESI) for Shuron, Inc. in 1987 revealed the presence of several metals and volatile organic compounds (VOC) at concentrations exceeding maximum contaminant levels (MCL) in monitoring wells near the Wastewater Settling Lagoons. Further investigation by WESI, including a 1990 groundwater quality assessment indicated the presence of elevated VOC and metals concentrations in groundwater near the Solids Lagoons.

A Site Screening investigation by the South Carolina Department of Health and Environmental Control (SCDHEC) showed VOC and metals in excess of MCL in one groundwater monitoring well downgradient of the Solids Lagoons. In March 1994, the EPA detected elevated metals, VOC, and semivolatile organic compound (SVOC) concentrations in surface soil and sediment samples from the site.

EPA ranked the Site and included it on the National Priorities List Proposed Update in the Federal Register, Rule No. 20, Vol.61, No. 117, on June 14, 1996. The Site was added to the National Priorities List in the Federal Register, Rule No. 17, Vol. 61, No. 247 on December 23, 1996.

In November 1994, EPA and Textron signed an Administrative Order on Consent, Docket No. 95-5-C, for a Removal Action and Remedial Investigation (RI) and Feasibility Study (FS) at the Shuron Site.

3.0 HIGHLIGHTS OF COMMUNITY PARTICIPATION

An information repository for the Site, which includes the Administrative Record (AR), was established in February 1995 at the Barnwell County Library, located at 2001 Haygood Avenue, Barnwell, South Carolina, 29812. The AR is also available to the public at US EPA Region IV Library, 61 Forsyth Street, Atlanta, Georgia, 30303. A mailing list was established for the Site, and a fact sheet was railed in February 1995. The fact sheet outlined the following: the objectives of the RI, a summary of the Site history, the various opportunities for public involvement (including Technical Assistance Grants), and the location of the information repository. EPA also conducted community interviews in March 1995 to inform the nearby residents of future activities at the site and to determine their concerns.

Prior to issuance of the Proposed plan, EPA met with local officials in April and May 1997, to inform them of the results of the sampling activities and to discuss various options EPA was evaluating to address the Site contamination and to solicit their input. EPA also conducted an availability session in Barnwell on November 20, 1997, to answer questions from the public concerning the site. After the availability session, EPA then issued the proposed plan in November 1997, which outlined EPA's preferred alternative. A public comment period for the proposed plan was held from December 5, 1997, to January 5, 1998. EPA held two public meetings on December 9, 1997 and January 22, 1998, where EPA representatives answered questions regarding the Site and the remedial alternatives under consideration, which were outlined in the proposed plan. EPA received a request for an extension to the public comment period, and extended the comment period through February 4, 1998. EPA received oral comments during the two public meetings, and one set of written comments during the sixty (60) day public comment period. Responses to the comments received by EPA are included in the Responsiveness Summary (Appendix A).

This ROD presents EPA's selected remedial action for the Site, chosen in accordance with CERCLA, as amended by SARA, and to the extent practicable, the NCP. The remedial action selection for this Site is based on information contained in the Administrative Record. The public and state participation requirements under Section 117 of CERCLA, 42 U.S.C. º 9617, have been met for this site.

4.0 SCOPE-AND ROLE OF THIS ACTION WITHIN SITE STRATEGY

The purpose of the remedial alternatives selected in this ROD is to reduce potential future risks at this Site from exposure to contaminated surface and subsurface soil, sediment, and groundwater. There is no unacceptable current human health risk present at the Site. However, there is a current ecological risk. The groundwater component of the remedial action is expected to eliminate the potential future risk to an on-site industrial worker, who represent persons who could potentially use contaminated groundwater for a potable water supply. The soil remedial action is expected to eliminated the potential risks to future workers and ecological receptors from direct exposure, as well as to prevent further leaching of contaminants to groundwater. This is the only ROD contemplated for this Site.

5.0 SUMMARY OF SITE CHARACTERISTICS

The RI investigated the nature and extent of contamination on and near the Site, and defined the potential risks to human health and the environment posed by the Site. A supporting RI objective was to characterize the Site-specific geology and hydrogeology. A total of approximately 104 surface soil samples (some of which are referred to as hydric soils) were collected and analyzed for various contaminants. Six of these samples were collected from background locations. Another 52 samples were analyzed for lead only. Twenty-six additional samples were analyzed for lead, chromium, and nickel, and another 16 samples were analyzed for arsenic, copper, lead, silver, and zinc. Ten samples were analyzed for the eight RCRA metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver). Seven of these samples were collected from background locations. A total of 103 subsurface soil samples were collected and analyzed for various parameters.

Groundwater samples from twenty-five wells were collected and analyzed for different compounds. Twenty-seven sediment samples were collected from 25 locations and analyzed for various contaminants. Surface water samples were collected from 34 locations and analyzed. The final Remedial Investigation (RI) Report was completed in January 1997, and the Final Feasibility Study (FS) Report was completed in April 1997.

5.1 Meteorology

The climate in the vicinity of Barnwell, South Carolina, is temperate. Typical summer weather in the Barnwell area is warm and humid. Daily high temperatures average from the upper 80s to the low 90s (degrees F), with nighttime lows in the upper 60s to lower 70s. Summer has the most rainfall, with greater than one-third of the total annual rainfall occurring during this period. The rain generally occurs as afternoon showers or thunderstorms except in the case of heavy rainfall associated with tropical storms or hurricanes. Rainfall is generally lowest during the fall months. The winter months, December through February, are relatively mild with periods of rain. Average high temperatures for the three-month period range from the mid 50s to upper 60s with average low temperatures ranging from the low 30s to the mid 40s. Winter rainfall is generally light.

5.2 Geologic and Hydrogeologic Setting

5.2.1 Geology/Soils

The Shuron Site is located in the Atlantic Coastal Plain Physiographic Province. The uppermost geologic units consist of interbedded clayey to silty sand, sand, and silty fill material. Groundwater in the uppermost unit is encountered at land surface (wetlands) to approximately 3 feet below land surface (uplands). At approximately 20 to 30 feet b1s, geologic units are encountered which consists of a well sorted, clean to slightly clayey or silty, sand. At about 65 feet b1s, a coarsening downward sequence of stiff clay, silty clay, and silt is encountered.

5.2.2 Hydrogeology

Regional groundwater flow in the coastal plain is controlled primarily by the gentle seaward dip of the sediments and by the location of principal recharge areas. Groundwater flow in the upper most units is primarily toward the nearest surface water drainage, which is the wetlands to the east and south of the facility). Major marine transgressions and regressions in the geologic past have created a series of relatively coarse-grained units overlying and/or underlying relatively fine-grained units. It is this sequence of deposition, coupled with large-scale structural features, which produced the major aquifers and confining units throughout the coastal plain. On a smaller scale, water-bearing units and water-retarding units exist within each aquifer system. In Barnwell County, the aquifer systems, in order of increasing depth below the surface, include the surficial aquifer, the upper and lower Floridan aquifer, the Black Mingo aquifer, and the Cretaceous aquifers.

5.3 Nature and Extent of Contamination

More detailed information can be found in the RI and FS reports, and in the Baseline Risk Assessment. The information below is summarized in Table 1. Contamination at the Site can be summarized as follows:

Groundwater Contamination.

The highest volatile organic compound (VOC) concentrations were detected in the shallow groundwater (maximum concentrations are given in parentheses): vinyl chloride (3700J Ig/L), 1,2-dichloroethene, total (47,000 Ig/L), 1,2-dichloroethane (2,600 Ig/L), trichloroethene (61,000 Ig/L), tetrachloroethene (52,000 Ig/L), toluene (2,400J Ig/L), ethylbenzene (20,000 Ig/L), and xylenes (total) (93,000 Ig/L). (The "J" qualifier indicates that the number given is an estimate rather than a precise quantity.) The maximum detected semivolatile organic compound (SVOC) concentrations were bis(2-ethylhexyl)phthalate at 310 Ig/L in the shallow groundwater and 610 Ig/L in the intermediate-depth groundwater. Lead (Pb) was detected at a maximum concentration of 124 Ig/L. Contaminant concentrations for all of the contaminants listed violate the Maximum Contaminant Levels (MCLs), or the EPA Action Level in the case of lead, which are often referred to as "drinking water standards." Therefore, Remedial Goals (RGs) for these contaminants were developed.

Surface Soil Contamination.

Six VOCs were detected in surface soils (which includes wetlands sediments/hydric soils): 1,2-dichloroethene, total (estimated (J) at 7.9J mg/kg), trichloroethene (0.85 mg/kg), tetrachloroethene (4.2 mg/kg), toluene (0.18J mg/kg), ethylbenzene (0.038J mg/kg), and xylenes, total (0.38J mg/kg). Vinyl chloride and 1,2-dichloroethane were not detected in surface soils. The maximum detected SVOC concentration in surface soils was bis(2-ethylhexyl)phthalate at 230 mg/kg. The maximum detected concentrations in surface/hydric soils are: lead (14,600 mg/kg), arsenic (136 mg/kg), copper (741 mg/kg), and zinc (5,170 mg/kg). Other contaminants were also detected. Because of direct contact exposure to humans or the ecological system, or because of the potential of the contaminants to leach to groundwater, RGs were derived for these contaminants.

TABLE 1
SUMMARY OF RI RESULTS BY MEDIA

SUMMARY OF GROUNDWATER RESULTS

CONTAMINANT	MAXIMUM CONCENTRATIONS (ug/L)	MCL/ACTION LEVEL
Vinyl chloride	3700J	2.0
1,2-dichloroethene	47,000	5.0
1,2-dichloroethane	2,600	70
Trichloroethene	61,000	5.0
Tetrachloroethene	52,000	5.0
Toluene	2,400	1000
Ethylbenzene	20,000	700
Xylenes (total)	93,000	10,000
Bis(2-ethylhexyl)phthalate	610	6.0
Lead	124	15

SUMMARY OF SURFACE SOIL RESULTS

CONTAMINANTS	MAXIMUM CONCENTRATIONS (mg/kg)
1,2-dichloroethene	7.9J
Trichlorocthene	0.85
Tetrachloroethene	4.2
Toluene	0.18J
Ethylbenzene	0.038J
Xylenes (total)	0.38J
Bis(2-ethylhexyl)phthalate	230
Lead	14,600
Arsenic	136
Copper	741
Zinc	5,170

TABLE 1 (con't)
SUMMARY OF RI RESULTS BY MEDIA

SUMMARY OF SUBSURFACE SOIL RESULTS

CONTAMINANTS	MAXIMUM CONCENTRATION (mg/kg)	MAXIMUM DEPTH (ft) (though contamination may be deeper if deepest sample to date still had contamination)
Vinyl chloride	9.1	2
1,2-dichloroethene	460	7.5
Trichloroethene	1,100	5
Tetrachloroethene	2,500J	7
Toluene	60	5
Ethylbenzene	1,400	10
Xylenes (total)	3,700	14
Bis(2-ethylhexyl)phthalate	110	10
Lead	17,400	14
Arsenic	117	14
Copper	400	7.5
Zinc	7,910	14

TABLE 1 (con't)
SUMMARY OF RI RESULTS BY MEDIA

SUMMARY OF SEDIMENT (Ditch/ creek/ wetlands) RESULTS

CONTAMINANT	MAXIMUM CONCENTRATIONS (mg/kg)
Vinyl chloride	0.2
1,2-dichloroethene	0.41
Toluene	2J
Ethylbenzene	16
Xylenes (total)	68
Bis(2-ethylhexyl)phtlate	11
Lead	7,470
Arsenic	57.3
Copper	341J
Zinc	2,080

SUMMARY OF SURFACE WATER RESULTS

CONTAMINANT	MAXIMUM CONCENTRATIONS (ug/L) (either lagoon (L) or wetlands (W))
Vinyl chloride	52 (L)
1,2-dichloroethene	1,400 (W)
Trichloroethene	10J (L)
Tetrachloroethene	15J (L)
Toluene	51 (W)
Ethylbenzene	17J (L)
Xylenes (total)	360 (L)
Bis(2-ethylhexyl)phthalate	95J (W)
Lead	343 (W)
Arsenic	5.6 (L)
Copper	116 (W)
Zinc	1,770J (L)

Subsurface Soil Contamination.

Listed below are the maximum concentrations of various contaminants detected in subsurface soils. Also included is the greatest depth to date that each contaminant was detected above the respective RG. The maximum concentrations do not usually correspond with the depths stated.

Subsurface detections included the following: vinyl chloride (9.1 mg/kg, maximum depth to 2 feet), trichloroethene (1,100 mg/kg, maximum depth to 5 feet), 1,2-dichloroethene, total (460 mg/kg, maximum depth to 7.5 feet), , tetrachloroethene (2,500J mg/kg, maximum depth to 7 feet), toluene (60 mg/kg, maximum depth to 5 feet), ethylbenzene (1,400 mg/kg, maximum depth to 10 feet), and xylenes, total (3,700 mg/kg, maximum depth to 14 feet). 1,2-dichloroethane was not detected in subsurface soils.

The maximum detected SVOC, bis(2-ethylhexyl)phthalate, was detected at a concentration of 110 mg/kg. The maximum depth at which bis(2-ethylhexyl)phthalate was detected was 10 feet. The maximum metal detections were: arsenic (117 mg/kg, maximum depth to 7 feet), copper (400 mg/kg, maximum depth to 7.5 feet), lead (17,400 mg/kg, maximum depth to 7 feet), and zinc (7,910 mg/kg, maximum depth to 7 feet). Other contaminants were also detected. These contaminants have the potential to leach to drinking water above drinking water standards, and therefore, RGs for groundwater protection were developed for them. Also during RD/RA, an RG based on protection of groundwater for lead may be established. The RGs for the protection of groundwater for Ethyl benzene, Toluene, and Xylenes (Total) may also be reevaluated. The RGs derived for these contaminants were such that they should not leach to groundwater above drinking water standards. However, these derived contaminant levels exceed most of the levels actually detected in soil samples, yet these contaminants were detected in the groundwater.

Also during RD/RA, an RG based on protection of groundwater for lead, may be established.

Surface Water Contamination.

The maximum VOC concentrations detected in lagoon surface waters were: vinyl chloride (52 Ig/L), trichloroethene (10J Ig/L), tetrachloroethene (15J Ig/L), ethylbenzene (17J Ig/L), and xylenes (total) (360 Ig/L). VOC contaminants 1,2-dichloroethene (total) (1,400 Ig/L), and toluene (51 Ig/L), were detected at maximum concentrations in non-lagoon surface waters. The compound 1,2-dichloroethane was not detected in lagoon or non- lagoon surface waters. The SVOC bis(2-ethylhexyl) phthalate was detected at a maximum concentration of 95J Ig/L in non-lagoon surface waters. The maximum detected concentrations of metals in surface water were: arsenic (5.6 Ig/L) and zinc (1,770J Ig/L) in lagoon surface waters and copper (116 Ig/L) and lead (343 Ig/L) in non-lagoon surface water. In the selected remedy, surface water contamination will be addressed through remediation of the other contaminated media.

Sediment Contamination.

The maximum detected concentrations of VOCs in sediments were: vinyl chloride (0.2 mg/kg) wetland sediments; and toluene (2J mg/kg), ethylbenzene (16 and 1,2-dichloroethene (total) (0.41 mg/kg) in ditch/creek/ mg/kg), and xylenes (total) (68 mg/kg) in lagoon sediments. The compounds 1,2-dichloroethane, trichloroethene, and tetrachloroethane, were not detected in ditch/creek/wetland or lagoon sediments (although tetrachloroethane was detected in subsurface soils beneath the lagoon sediments at a maximum concentration of 1.8 mg/kg). The maximum detected. SVOC concentrations in ditch/creek/wetland sediments was bis(2-ethylhexyl)phthalate at 11 mg/kg. Four inorganic (metals) contaminants were detected in sediments (maximum concentrations are given in parentheses): arsenic (57.3 mg/kg), lead (7,470 mg/kg), and zinc (2,080 mg/kg) in lagoon sediments; and copper (341J mg/kg) in ditch/creek/wetland sediments. Groundwater protection RGs were developed for some contaminants to prevent them from leaching to groundwater above drinking water standards.

RGs for the protection of the ecological system were also developed for the contaminated sediments, with one area of exception. The contaminated sediments in the Eastern Wetlands area (approximately 13 acres in the middle of the Eastern Wetlands) also currently pose a threat to the ecological system. However, after careful evaluation of the issues that would be involved in any remediation effort, EPA believes it would more protective to the ecological system to not remediate that portion of the wetlands. The most highly contaminated sediments in the area (from the Northern Drainage Ditch Area) will be excavated, thus preventing further migration of metals contaminants into the Eastern Wetlands. In addition, the area is flooded for much of the year, and cannot be easily reached, and as such, it would be very difficult to conduct work there. Substantial destruction of uncontaminated areas would occur in the process of attempting to reach the contaminated sediments, from such activities as road building. Also, the area is not contaminated with VOCs, which could pose a risk to the groundwater via leaching. Lastly, natural sediments will cover the contaminated metal sediments in the Eastern Wetlands, since the higher contaminated source material in the Northern Drainage Ditch area will be removed.

6.0 SUMMARY OF SITE RISKS

A Baseline Risk Assessment was conducted to evaluate the Site risks to human health and the environment, under current and reasonable future land uses. The Baseline Risk Assessment serves to provide a basis for taking action, and identifies the specific contaminants and the exposure media (soil, groundwater, sediments) that need to be addressed by the remedial action. It serves as an indication of the risks posed by the Site if no action were to be taken.

This section of the ROD contains a summary of the Baseline Risk Assessment conducted for the Site. The Baseline Risk Assessment consists of the following components: identification of contaminants of concern, exposure assessment, toxicity assessment, and risk characterization. The ecological risk assessment and remedial goals are also summarized below.

6.1 Contaminant of Concern

Data collected during the RI were evaluated in the Baseline Risk Assessment. Contaminants were screened for the Baseline Risk Assessment using stringent risk-based criteria and by comparison to background levels for naturally occurring constituents. Contaminants in the following media were evaluated for human health risk: soil (surface and subsurface), groundwater (shallow, intermediate, deep), surface water (lagoons, drainage ditches, creek), and sediment (lagoons, drainage ditches, creek). The risk assessment evaluated 34 different chemicals which failed the risk-based screening in one or more of these media. Contaminants were not included in the Baseline Risk Assessment evaluation if any of the following criteria applied:

- For an inorganic compound or element, it was not detected at or above twice the background concentration.

- For an inorganic compound or element, it was detected at low concentrations, had very low toxicity, and was judged to be naturally occurring.

- The sampling data included analytical results flagged

6.2 Exposure Assessment

Because the site is currently vacant, a trespasser was evaluated as a receptor in the current use scenario. In this scenario, a 7 to 16 year old (9 year exposure duration) individual is assumed to trespass onto the site up to 26 days per year (depending on the area of the site).

Incidental ingestion and skin contact with contaminated soil, sediment, and surface water is assumed.

While the site land use may be commercial/industrial in the future (as it has been in the past), there is also the potential for part of the Site to become residential in a future use scenario, and that a future resident potentially could install a private well for potable use. This is based on the fact that there are nearby residential areas. (However, municipal water, is available to the area.) Therefore, since both a future worker and a future resident could potentially be exposed to Site contaminants, both populations were evaluated in the BRA. The assumed exposure pathways consist of: ingestion of chemicals in contaminated groundwater, inhalation of chemicals volatilized during showering, and incidental contact (ingestion/dermal contact) with soil contaminants.

The future site worker (exposure duration of 25 yrs) is assumed to incidentally ingest and dermally contact surface soil and to drink site groundwater while at work. The construction worker(total exposure duration of 13 days) is assumed to contact subsurface as well as surface soil. It was assumed that the future adult resident would ingest two (2) liters per day of groundwater for a twenty-four (24) year period, and that a child would drink one liter of water per day for six years. The child resident is assumed to incidentally ingest 200 mg of soil and to breath 15 cubic meters (m 3) of air per day. The adult resident is assumed to incidentally ingest 100 mg of soil and to breath 20m 3 of air per day. (These are EPA default exposure assumptions for the worker and resident.)

6.3 Toxicity Assessment of Contaminants

Under current EPA human risk assessment guidelines, the likelihood of carcinogenic and noncarcinogenic effects are considered separately. A brief summary of these separate approaches follows.

Chemicals are classified for carcinogenicity according to EPA's weight-of-evidence system. This classification scheme is as follows: Group A - Known human carcinogen; Group B - Probable human carcinogen; Group C - Possible human carcinogen; Group D-humans.

Carcinogens. EPA has developed slope factors (SF) to estimate excess lifetime cancer risks associated with exposure to potentially carcinogenic contaminants of concern (Groups A, B, C). SFs, which are expressed as risk per milligram per kilogram of daily dose, are multiplied by the estimated intake of a potential carcinogen, in mg/kg-day, to provide an upper-bound estimate of the excess lifetime cancer risk associated with exposure at that intake level. The term "upper bound" reflects the conservative estimate of the risks calculated from the SF. Use of this approach makes underestimation of the actual cancer risk highly unlikely. Slope factors are derived from the results of human epidemiological studies or chronic animal bioassay data to which mathematical extrapolation from high to low dose, and from animal to human dose, has been applied.

Noncarcinogens. EPA has developed reference doses (RfDs) to establish the potential for adverse human health effects from exposure to the contaminants of concern exhibiting noncarcinogenic effects. RfDs, which are expressed in units of mg/kg-day, are estimates of daily exposure levels for humans, including sensitive subpopulations, that are likely to be without appreciable risk of adverse effects. RfDs are derived from human epidemiological studies or animal studies to which uncertainty factors have been applied (i.e., to account for the use of animal data to predict effects on humans).

The risk from exposure to lead is determined by calculating the predicted blood lead level and comparing it to the EPA acceptable criteria of no greater than 5% probability of exceeding 10

Ig/dL lead in blood. EPA uses the I.E.U.B.K. model to predict the blood lead level.

6.4 Risk Characterization

The final step of the Baseline Risk Assessment, the generation of numerical estimates of risk, was accomplished by integrating the exposure and toxicity information.

For carcinogens, the result is expressed as the excess cancer risk posed by Site contaminants. CERCLA establishes a range of 1×10^{-6} to 1×10^{-4} as the acceptable range for lifetime excess carcinogenic risks. Excess risk in this range means that the exposed person has a probability of one in one million (1×10^{-6}) to one in 10,000 (1×10^{-4}) additional risk of developing cancer over a lifetime over and above the risk of cancer from other causes. The calculated cancer risks from all the Site contaminants are added together to determine the total site risk.

The potential for noncarcinogenic effects is evaluated by comparing an exposure level over a specified time period (e.g., 25 year exposure to a worker) with a reference dose derived for a similar exposure period. The ratio of exposure dose to the RfD is called a hazard quotient (HQ). An HQ less than 1 indicates that a receptor's dose of a single contaminant is less than the RfD, and that toxic noncarcinogenic effects from that chemical are unlikely. By adding the HQs for all contaminants of concern that affect the same target organ (e.g. liver) by the same mechanism, the Hazard Index (HI) is generated. An HI less than 1 indicates that noncarcinogenic toxic effects from all contaminants are unlikely.

Carcinogenic risk and noncarcinogenic HI values were calculated for both the current land use scenario, with residents living near the Site, and the reasonably possible future land uses, which include commercial/industrial, residential, and a construction scenario (shorter duration of exposure). The Baseline Risk Assessment determined that the total cancer risk (using Reasonable Maximum Exposure) for the current scenario (nearby resident who trespasses onto the Site) was less than 1×10^{-6}; therefore, the Site does not pose an unacceptable cancer risk under the current exposure scenario. The total HI for the current scenario was less than 1.0, indicating that the Site does not pose an unacceptable non-carcinogenic risk under the current exposure scenario evaluated in the Baseline Risk Assessment. Therefore, in summary, the Site does not pose any unacceptable current risk to nearby residents.

The Baseline Risk Assessment determined that the total cancer risk for the future onsite worker ranged from 7×10^{-5} to 3×10^{-2}, depending on which portion of the groundwater is assumed to be the source of drinking water for the worker. The HI for the same receptor ranged from 0.3 to 200. Thus the risks exceed EPA's acceptable risk criteria (carcinogenic and noncarcinogenic) for the worker who drinks water from the contaminated groundwater.

The risks estimated from the residential scenarios are also well above EPA's acceptable risk values since the exposure is greater for the onsite future resident than for a worker. The cancer risk for the future onsite resident ranged from 2×10^{-4} to 2×10^{-1}. The toxic HI ranged from 2 to 2000 for this receptor. These risks all exceed EPA's acceptable risk range regardless of the portion of the affected groundwater the resident was assumed to have as their drinking water source. The majority of the onsite risks (both cancer and noncarcinogenic) for the future worker and residential scenarios are attributable to ingestion of volatile organic chemicals in the groundwater. In addition to these risk exceedances, MCLs were exceeded for organic contaminants and lead exceeded its action level in groundwater.

The construction worker scenario (assumed exposure to subsurface as well as surface soils, but not to site groundwater) resulted in acceptable cancer risk (no greater than 1×10^{-6}) and HI (less than 1.0).

The future worker scenario assessed the lead in the site soil using the Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil (EPA, December 1996). The risks from soil lead to this receptor were found to be unacceptable.

For the residential scenario, potential exposure of a child to the lead in the soil and groundwater was assessed using the EPA Integrated Exposure Uptake Biokinetic Model for Lead in Children (IEUBK). The risks from soil and groundwater lead to this receptor were found to be unacceptable.

The actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

6.5 Ecological Risk Assessment

No state or federally designated endangered or threatened species are found at the Site. However, the ecological assessment indicated potential risks to invertebrates and amphibians in the wetlands from exposure to metals contamination. The specific contaminants causing risk include lead, zinc, arsenic, and copper. This unacceptable risk was determined through toxicity testing of sediment-dwelling invertebrates. For example, for lead contamination, 700 mg/kg lead was found to be the concentration at which 50% of the test population died. Higher concentrations resulted in greater mortality. In addition, elevated concentrations of arsenic, copper, and zinc were also found in areas with elevated lead concentrations, which also posed an unacceptable risk to ecological receptors. Remediation of wetland areas based upon lead RGs should address areas containing toxic levels of these other metals as well.

6.6 Remediation Goals

The results of the Baseline Risk Assessment concluded that the media of concern are surface and subsurface soils, sediments, surface water and groundwater. Exposure to these media that exceed acceptable levels, resulted in risks to human health (assuming an industrial future use), or to the environment. As a result, Remediation Goals (RGs) were developed for groundwater, surface soils, subsurface soils (due to leaching of contaminants to groundwater), and sediments, for protection of a future industrial worker or for the protection of ecological receptors. Surface water contamination would be addressed through the remediation of the other media.

Presently, the Site is not in use. There is a 185,000-square- foot building onsite, in fair condition, that could be used in the future for industrial purposes. Discussions with nearby residents frequently elicited questions such as "when is the plant going to reopen" or statements to the effect that "we would like a company to open a new facility so that nearby local residents could be employed there." In addition, significant cost may be incurred for removing the building, if the property was to be converted for a residential use. EPA is therefore remediating the Site to industrial cleanup standards.

EPA has established specific RGs (i.e. cleanup standards) for soil, sediments, and groundwater contaminants. Surface water exceedances will be addressed by addressing the groundwater. Such standards are derived from several federal environmental laws, including the Safe Drinking Water Act (for water systems and potable water sources such as groundwater) and the Clean Water Act (for surface waters). The State of South Carolina has similar statutes. Contaminants regulated under these statutes are present at this Site. In cases where there is no state or federal standard, remediation goals can be developed based on the Baseline Risk Assessment for human health (risk assessment calculations) and the protection of the environment (such as using toxicological studies). RGs for surface soil were developed based on the site-specific Baseline

Risk Assessment for a future industrial worker. Subsurface soil RGs were developed such that the contaminants would not leach to groundwater above drinking water standards. RGs for the wetland sediments were developed from toxicity testing conducted at the site for protection of the environment.

Table 2 summarizes the remediation goals for soil and groundwater at the Site. The areas potentially requiring remediation are depicted on Figures 2 and 3, representing groundwater and soil respectively. However, the exact areas requiring remediation will be determined during Remedial Design/Remedial Action (RD/RA) after further sampling is conducted. Also during RD/RA, an RG based on protection of groundwater for lead in soils may be established. The RGs for the protection of groundwater for Ethyl benzene, Toluene and Xylenes (Total) may also be reevaluated. The RGs derived for these contaminants were such that they should not leach to groundwater above drinking water standards. However, these derived contaminant levels exceed most of the levels actually detected in soil samples, yet these contaminants were detected in the groundwater.

In addition, the selected remedy (section 9 of this ROD) does not include allowing materials classified as RCRA hazardous to remain onsite. Therefore, such materials must "pass" the RCRA TCLP test, which establishes whether a material is hazardous waste. This would include material that is treated such that it "passes" the RCRA TCLP test. In TCLP testing the following contaminant levels in the leachate render a waste as RCRA Hazardous: For lead leachate concentrations greater than or equal to 5 ppm. For TCE greater than or equal to 0.5 ppm, PCE greater than or equal to 0.7 ppm.

7.0 DESCRIPTION OF REMEDIAL ALTERNATIVES

The FS considered a wide variety of general response actions and technologies for remediating the various contaminated media. The various technologies were screened and those listed below on Table 3 were considered in the FS Report.

Based on the FS, Baseline Risk Assessment, and Applicable or Relevant and Appropriate Requirements (ARARs), the remedial action objectives (RAOs) listed below were established for the Site. Alternatives were developed with the goal of attaining these objectives:

- Prevent ingestion/direct contact with surface soil, sediment, and hydric soil having:

    < Carcinogen concentrations above levels that would exceed an acceptable cancer risk range of 10 -4 to 10 -6 and,

    < Noncarcinogen concentrations above Federal or State standards, or in the absence of standards, above levels that would exceed an acceptable Hazard Index (HI) of 1.0.

< Prevent migration of contaminants from surface and subsurface soils (uplands and wetlands) that would pose a risk to human health due to leaching of contaminants to groundwater in excess of Federal/State limits or health-based levels.

Table 2
REMEDIAL GOAL (Rgs)

CONTAMINANTS OF CONCERN	GROUNDWATER (RGs) UG/L
Bis-2-ethylhexyl phthalate	6.0
1,2-Dichloroethane	5.0
1,2-Dichloroethene (Total)	70
Tetrachloroethene	5.0
Trichloroethene	5.0
Vinyl Chloride	2.0
Ethyl benzene	700
Toluene	1000
Xylenes (Total)	10,000
Lead	15*

CONTAMINANTS OF CONCERN	RGs for Protection of Groundwater. Soil concentrations below which leaching above MCLs is not expected to occur (mg/kg)	MCLS (ug/l)
Bis-2-ethylhexyl phthalate	Not detected in TCLP leachate, but detected in total results of soil samples. May be determined in RD/RA.	6.0
1,2-Dichloroethane	Not detected in TCLP leachate	5.0
1,2-Dichloroethene (Total)	1.5	70
Tetrachloroethene	0.1	5.0
Trichloroethene	0.09	5.0
Vinyl Chloride	0.74	2.0
Ethylbenzene	62	700
Toluene	136	1000
Xylenes (Total)	1400	10,000
Lead	May be determined during RD/RA	15*

*Action Level

CONTAMINANTS OF CONCERN	RGs FOR SURFACE SOILS (mg/kg)
Lead - Industrial	1150
Arsenic	34
Beryllium	12
CPAH (BAP-TE)(Polycyclic Aromatic Hydrocarbons)	5

ECOLOGICAL RGs BASED ON TOXICITY STUDIES

CONTAMINANTS OF CONCERN	mg/kg
Lead	700
Arsenic	15
Copper	150
Zinc	350

The RGs for the protection of groundwater for Ethyl benzene, Toluene, and Xylenes (Total), and bis-2-ethylhexyl phthalate may be reevaluated during RD/RA since the calculated levels exceed most of the levels detected in the soil samples, yet these contaminants were detected in the groundwater. Lead may have an RG established for protection of groundwater during RD/RA.

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TABLE 3
GROUNDWATER ALTERNATIVES

7 of 9 Criteria	Alternative 1 No Action	Alternative 2 Limited Action	Alternative 3 Source Removal w/dewatering, evaluation period, active ground water treatment, and Nat. Atten., if applicable	Alternative 4 Source removal w/ dewatering, source area extraction wells or trenches	Alternative 5 Source removal w/dewatering, property boundary extraction wells
Overall Protection	Would not be overall protective since no action is occurring, just groundwater monitoring.	Would not be overall protective since only a minimal amount of contaminated. gw is removed during source removal. No action after this, only institutional controls.	Would be overall protective, since the contaminated groundwater would be addressed.	May not be overall protective, since only the source area contaminated. gw would be addressed. The contaminated. gw that is past the source area would not be addressed (i.e. between source area and property boundaries).	Would be overall protective, since the contaminated gw would be addressed. However, it may take longer than other alternative. since the source area contaminated gw would have to migrate to the property boundary to be addressed.
Meet ARARs	Would not meet ARARS since no action is occurring.	Would not meet ARARs since most contamination is not addressed.	Would meet ARARs, since the contaminated groundwater would be addressed.	May not meet ARARs, since only the source area contaminated. gw would be addressed, and not the source area.	Would meet ARARs, since the contaminated gw would be addressed.
Long-Term Protective and Permanent	Would not be long-term protective since no action is occurring.	Would not be long-term protective since most contamination is not addressed.	Would be long-term protective, since the contaminated groundwater would be addressed.	May not be long-term effective for reasons stated above	Would be long-term protective since the contaminated. gw would be addressed.
Reduce Toxicity, Mobility & Volume (TMV) Through Treatment	Would not reduce toxicity, mobility or volume of contaminants.	Would not reduce toxicity, mobility or volume of contaminants, since most contamination is not addressed.	Would reduce the TMV, since the contaminated groundwater would be addressed.	Would reduce the TMV of some of the contaminated. gw through treatment, but not all contaminated. gw.	Would reduce the TMV, since the contaminated. groundwater would be addressed.
Short-Term Effectivesiess	No shorterm implementation risk since no action is occurring	No risk since minimal action is occurring	Some risk during excavation. and during extraction of contaminated. gw.	Some risk during excavation, and during extraction of contaminated. gw.	Some risk during excavation. and during extraction of contaminated. gw.
Implementability	No implementation difficulties since there would be no action.	Minimal implementation difficulties since there would be minimal action.	Some w/ extraction.	Some W/ extraction.	Some W/ extraction.
Cost (PW)	$ 1.35 million	$1.8 million	$2.4 - 5.0 million	$3.8 - 4.7 million	$4.6 million

TABLE 4
SOIL ALTERNATIVES

7 of 9 Criteria	Alternative 1 No Action	Alternative 2 Limited Action	Alternative 3 Excavation and On-Site Capping with No Bottom Liner	Alternative 3A Excavation and On-Site Capping with Bottom Liner for RCRA Non-Hazardous Soil and Off-Site Disposal of RCRA Hazardous Soil
Overall Protection	Would not be overall protective since no action is occurring.	Would not be overall protective since none of the contaminated soil is addressed, just a deed restriction informing future owners of the contamination. Also, contaminants would continue to leach to groundwater and there would be a continuous risk to the environment.	Uncertainty that this is overall protective since contaminated. could leach to gw above MCLs.	May be overall protective, but there is some concern that the RCRA hazardous. waste may leach to gw above MCLs.
Meet ARARs	Would not meet ARARs since no action is occurring.	Would not meet ARARs since contamination is not addressed.	Uncertatnty that this alternative. meets ARARs since contaminated. could leach to gw above MCLs.	May meet ARARs, but there is some concern that the RCRA hazardous, waste may leach to gw above MCLs.
Long-Term Protective and Permanent	Would not be long-term protective since no action is occurring.	Would not be long-term protective since contamination is not addressed.	Uncertainty that this alternative. is long-term protective and permanent, since contaminated. may leach into the gw above MCLs.	May be long-term protective, but there is some concern that the RCRA hazardous. waste may leach to gw above MCLs.
Reduce TMV Through Treatment	Would not reduce toxicity and mobility or volume.	Would not reduce TMV of contaminants.	Would not reduce TV of contaminants, but should reduce the mobility to some degree.	Would not reduce TV of contaminants, but should reduce the mobility to some degree.
Short-Term Effectiveness	No risk since no action is occurring.	No short-term implementability risk since no action is occurring.	Some risk during excavation from lead dust and VOCs in the air.	Some risk during excavation.
Implementability	No implementation difficulties since there would be no action.	No implementation difficulties since there would be no action.	Minimal.	Minimal.
Cost (PW)	$0	$120,000	$7.7 million	$9.0 million

TABLE 4 (con't)
SOIL ALTERNATIVES

7 of 9 Criteria	Alternative 3B Excavation and On-Site Capping with Bottom Liner for RCRA Non-Hazardous Soil, Offsite RCRA Hazardous Soil.	Alternative 4 Stabilization//Solidification	Alternative 5 In-situ Thermal treatment w/ a) Containment or b) Stabilization/ Solidification	Alternative 6 Thermal Desorption with a) Containment or b)	Alternative 7 Off-Site Disposal
Overall Protection	Should be overall protective, since all had waste would be removed from the site, and the rest land filled; if the landfill is maintained indefinitely.	Would be overall protective though there may be some diff. Stabilization/Solidification VOC centime. soils such that they do not leach contam. into the gw above MCLs.	According to literature, it may be overall protect.	Would be overall protective since the organic soils are treated and the metal soils are treated or contained such that they should not leach to gw above MCLs.	Would be overall plot. since all contam. soils would be removed from the site.
Meet ARARs	Should meet ARARs, since all haz waste would be removed from the site, and the rest landfilled; if the landfill is maintained indefinitely.	Would meet ARARs though there may be some difficitlty, Stabilization/ Solidification VOC contaminated soils such that they do not leach contamination into the groundwater above MCLs.	According to literature, it may meet ARARs.	Would meet ARARs since the organic soils are treated and the metal soils are treated or contained such that they should not leach to groundwater above MCLs.	Would meet ARARs since all contaminated soils would be removed from the site.
Long-Term Protective	Should be long-term protective as described above.	Would be long-term protective though there may be some diff. Stabilization/Solidification VOC contaminated. soils so that they do not leach contaminated. into the groundwater above MCLs.	According to literature, it may be long-term protective.	Would be long-term protective since the organic soils are treated and the metal soils are treated or contained such that they should not leach to groundwater above MCLs.	Would be long-term protective and permanent, since all contaminated soils would be removed from the site.
Reduce TMV Through Treatment	Some if haz. waste disposed off-site is treated.	Would reduce toxicity and mobility but not volume	If effective, it would reduce the TMV of the organic contamination and possibly the inorganic (if Stabilization/Solidification used).	Would reduce TMV oforganics, & T&M of inorganic soils if Stabilization/Solidification. If contained, will not reduce the TMV of metal contaminants.	Some if waste disposed off-site is treated.
Short-Term Effectiveness	Some risk during excavation. Applies to all alternatives, but Alternatives 1 and 2.	Some risk during excavation and Stabilization/Solidification activities.	Minimal risk for the in-situ thermal part, some risk if Stabilization/ Solidification utilized.	Some risk during excavation and thermal desorption (and Stabilization/Solidification if this option is chosen).	Some risk during excavation and minimal during transport.
Implementability	Minimal.	Some difficulty during excavation and Stabilization/ Solidification activities.	May be difficult to implement due to saturated clayey soils.	Some difficulty during excavation and greater difficutty w/thermal.	Some difficulty during excavation
Cost (PW)	$11.2 million	$10.6-20.3 million	$10 - 15 million	$19.3-27.0 million	$11.8 million

- Prevent concentrations of contaminants from exceeding the applicable Federal and South Carolina Ambient Water Quality Criteria for surface waters.

- Restore the groundwater system to potential productive use, by cleanup to the standards described above, and by minimizing the migration of the contaminants beyond the existing limits of the contaminant plume.

- Prevent direct contact with sediments or hydric soils that would result in an unacceptable risk to ecological receptors.

- Prevent ingestion of contaminated groundwater from the Site containing:

  - Carcinogen concentrations above Federal or State standards, and above levels that would exceed an acceptable cancer risk range of 10 -4 to 10 -6 (unless the risk manager decides that a risk level less than 10 -4 (i.e., a risk between 10 -4 and 10 -6) is unacceptable due to site-specific conditions), and
  - Noncarcinogen concentrations above Federal or State standards, or in the absence of standards, above levels that would exceed an acceptable Hazard Index (HI) of 1.0.

Technologies considered potentially applicable to the various contaminated media were further evaluated based upon their effectiveness and implementability. Listed below are those alternatives which passed this final screening, and were considered for remediation in the FS Report. Costs for each alternative are given as a total of the net present worth costs ("PW cost"), which includes a capital cost component (typically for construction), added to an operations-and-maintenance ("O&M") cost.

Alternatives for Remediation of Groundwater. Five (5) alternatives were developed to address groundwater contamination. The components of Alternative 2, institutional controls and groundwater and surface water monitoring, are implied for all alternatives, except no action. A source removal as discussed in the Soil Alternative 3B is also included with Alternatives 3 to 5. The costs for monitoring for all the alternatives, is for a thirty (30) year period. For the alternatives which involve a treatment technology, the cost is for a ten (10) year operating period. For each alternative, remedial action objectives will be considered met when the concentrations listed in Table 2 are not exceeded in any monitoring wells, continuously.

7.1 Alternative 1: No Action

Under the no action alternative, the Site is left "as is" and no funds are expended for the control or cleanup of the contaminated groundwater (including no source removal). If no action is taken, future risks to potential persons living on or working at the Site will remain. Because hazardous contaminants would remain, five (5) year reviews would be required under CERCLA. PW Cost: $1.35 million.

7.2 Alternative 2: Source Removal with Groundwater Extraction During Excavation Period

This alternative includes the use of a wellpoint system to dewater the soil/sediment source areas for excavation. Excavation of source areas would be conducted in parallel and includes: the Wastewater Lagoons, the Solids Lagoons area, the Fill/Debris area, the Northern Drainage Ditch, and the Southern wetlands, including the southeast corner. Where groundwater extraction is required for source removal, the water table must be lowered approximately five (5) feet below the ground surface, and deeper in some locations. Groundwater to be extracted from these source areas contain the highest concentrations of contaminants of concern (COCs, or chemicals for which RGs have been established) on site. The groundwater extraction proposed in this alternative would occur during the period of excavation only. Extracted groundwater would be treated through an above-ground portable treatment system possibly consisting of an air stripper, liquid and vapor phase carbon, and a frac tank. The treatment system effluent would be discharged to Turkey Creek (through an NPDES Permit), groundwater (through an underground injection permit), or the local POTW.

The institutional controls to be used are deed notations and well permit restrictions. Deed notations limit future use of the aquifer for such purposes as potable and industrial water supplies, irrigation, and washing. Permit restrictions issued by the State of South Carolina would restrict all well drilling permits issued for new wells on properties that may draw water from the contaminated groundwater plume. These restrictions would be written into the property deeds to inform future property owners of the possibility of contaminated groundwater beneath their property. Groundwater monitoring would involve monitoring existing wells and additional monitoring wells (as well as the temporary extraction wells, unless EPA approves their abandonment). Groundwater samples from the wells would be collected and analyzed periodically to evaluate contaminant concentrations and to monitor the extent and direction of contaminant migration. In addition, surface water monitoring especially from the Southern Wetlands including the South Ditch) would also be conducted to monitor the groundwater plume. PW Cost: $1.8 million.

7.3 Alternative 3. Source Removal with Temporary Groundwater

Extractign for Dewatering, Data Collection/Aquifer Evaluation, Active Groundwater Treatment of remaining contaminated groundwater, and if applicable. Monitored Natural Attenuation.

Some of the contaminated soils to be excavated during the source removal (as described in Soil Alternative 3B below) are located below the water table, so that those areas will need to be dewatered during excavation. A temporary groundwater recovery and treatment system (as described in Groundwater Alternative 2) will be used for dewatering purposes during the source removal.

For this alternative, the system will be operated for an additional four to six months after completion of the soil removal.

An evaluation period for gathering data to design a proactive groundwater treatment system (pump and treat, recirculation wells, air-sparging, or a combination) to achieve RGs throughout the entire groundwater plume, will be conducted before, during and after the source removal. If, during the evaluation period, monitored natural attenuation can be demonstrated to be as effective as active remediation (to be determined by EPA and in accordance with EPA's guidance documents), within a comparable time frame, then this approach may be applied to the appropriate portions of the contaminated groundwater plume. If this occurs, a ROD Amendment or ESD will be completed by EPA as determined necessary by EPA or SCDHEC. This evaluation period will be completed within 6 months of the shutdown of the temporary system. This will be followed by construction and operation of the groundwater system. PW Cost: $2.4 - $5.0 million.

7.4 Alternative 4 - Groundwater Extraction and Treatment in Source Area

As described above for Alternative 3, since some of the contaminated soils to be excavated during the source removal are located below the water table, those areas will need to be dewatered during excavation. A temporary groundwater recovery and treatment system (as described in Groundwater Alternative 2) will be used for dewatering purposes during the source removal. The temporary groundwater extraction proposed in this alternative would occur during the period of excavation only.

After the soil excavation, active treatment of groundwater utilizing a pump and treat system (extraction trench(es) or wells), would occur in the Fill/Debris area, the Solids Lagoon area, and downgradient of the Solids Lagoon area. The extraction system will create a zone of influence and prevent the further migration of COCs from the source area. The contaminated groundwater not within the capture zone, would continue to migrate. PW Cost: $3.8 - 4.7 million.

7.5 Alternative 5 - Groundwater Extraction and Treatment Near Property Boundary

As with the alternatives described above, areas where contaminated soils are below the water table will be dewatered during excavation. A temporary groundwater recovery and treatment system (as described in Groundwater Alternative 2) will be used for dewatering purposes during the source removal. The temporary groundwater extraction proposed in this alternative would occur during the period of excavation only. To prevent further migration of COCs, this alternative includes the installation of an extraction well system near the property boundary (railroad bed). The configuration may consist of an irregular line of wells based on the COC concentrations. To capture all of the flow paths which contain concentrations exceeding MCLs near the property boundary or migrating towards the property line, a line of extraction wells approximately 900 feet long may be required. The extraction wells may need to be spaced at approximately 40-foot centers and installed to the bottom of the shallow water-bearing unit (approximately 15 feet), depending on the hydraulic properties of this shallow unit. This spacing will require the installation of a number of extraction wells near the property boundary. The exact number and configuration of wells would be determined during RD/RA. This alternative will take longer to reach the remediation goals because of the time necessary for the contaminant plume to migrate to the extraction wells. PW Cost: $4.6 million.

Alternatives for Remediation of Soil. Seven (7) alternatives were developed to address soil contamination. The components of Alternative 2, institutional controls and groundwater and surface water monitoring, are implied for all alternatives, except the no action alternative. A source removal consisting of excavation of all soils which exceed RGs, as described in Soil Alternative 3B, is considered a part of each of the soil Alternatives 3B through 7. Soil includes surface and subsurface soils from the upland areas, as well as the wetland "hydric" soils and sediments, referred to in the FS Report and subsurface soils from the wetlands. For each alternative, remedial action objectives will be considered met when the concentrations listed in Table 2 are not exceeded.

7.6 Alternative 1: No Action

Under the no action alternative, the Site is left "as is" and no funds are expended for the control or cleanup of the contaminated surface and subsurface soils, and sediments. If no action is taken, future risks to potential persons living on or working at the Site will remain. Because hazardous contaminants would remain, a five (5) year review would be required under CERCLA. PW Cost: $0.

7.7 Alternative 2: Limited Action

In this alternative, institutional controls would be implemented and a fence would be constructed around the area within which surface soils exceed Rgs. The institutional controls would include a deed or other restriction limiting uses and activities of those portions of the property in which soils exceeding Rgs have been left in place. The deed restriction would serve as notification to potential purchasers or developers of the property that land use is restricted in these areas and the location of the untreated soils. Fencing commonly used to limit access is 6 or 8-foot high chain-link; barbed wire would be strung along a top brace as an additional deterrent to trespassers. Signs would be posted at regular intervals, warning the trespasser of the potential danger. Routine inspection is required to maintain the fence. PW Cost: $120,000.

7.8 Alternative 3: Excavation and On-Site Capping with No Bottom Liner

Contaminated soil with concentrations exceeding RGs in Table 2, including RCRA hazardous and RCRA non-hazardous soils, would either be capped in place, for some of the metals-only-contaminated soil (in or near the groundwater), with an engineered cap; or excavated (soil containing both metals and organics) and placed under an engineered cap. The design and construction of the capped areas would include a low permeability Flexible Membrane Liner (FML) cap. Capped areas would be isolated by fencing. Contaminated soils that are excavated would be placed at least three feet above the seasonal high water table in the areas set aside for construction of the cap(s). Clean fill will be added if necessary to create this separation. Initial lifts will be of metal contaminated soils passing the RCRA TCLP test, and the upper lifts will consist of higher concentration metals contamination (RCRA hazardous) and mixed VOCs and metals contaminated soils (some of which would also be RCRA hazardous).

Those soils to be excavated that are saturated (i.e. wet) would be transported to a construction pad with controlled drainage (collection and treatment), and mixed with drying agents such as quicklime to absorb excess moisture and improve their physical and load bearing characteristics. In addition, VOCs would be released from the contaminated soils from the mixing process with the dewatering reagent, as well as from materials handling processes. During Remedial Design, laboratory treatability testing and field pilot studies will be conducted to gather volatilization data to predict emissions during full scale soil excavation and modification activities, and to determine the amount of VOCs remaining in the soils. Soil vapor extraction (SVE) laterals may be placed throughout the organic contaminated soils beneath the cap, unless limited volume and concentrations of VOCs remain or it is determined during remedial design that SVE would not be effective due-to permeability issues. PW Cost: $7.7 million.

7.9 Alternative 3A: Excavation and On-Site Capping with-Bottom Liner for all Contaminated Soils

All contaminated soil with concentrations exceeding the RGs in Table 2, including RCRA hazardous and RCRA non-hazardous soil, would be excavated and moved to an engineered containment system (cap). The design and construction of the containment areas would include components such as a low permeability FML cap, an underliner and a leachate collection system. Containment areas would be isolated by fencing.

Excavated soils that are saturated would be transported to a construction pad with controlled drainage (collection and treatment) and mixed with drying agents such as quicklime to absorb excess moisture and improve their physical and load bearing characteristics. In addition, VOCs would be released from the contaminated soils during the mixing process with the dewatering reagent, as well as from materials handling processes. During Remedial Design, laboratory treatability testing and field pilot studies will be conducted to gather volatilization data to predict emissions during full scale soil excavation and modification activities, and to determine the amount of VOCs remaining in the soils. Soil vapor extraction (SVE) laterals may be placed throughout the organic contaminated soils beneath the cap, unless limited volume and concentrations of VOCs remain or it is determined during remedial design that SVE would not be effective due to permeability issues. PW Cost: $9.0 million.

7.10 Alternative 3B: Excavation and On-Site Capping with Bottom Liner for RCRA Non-Hazardous Soil and Off-Site Disposal of RCRA Hazardous Soil

All contaminated soils that exceed RGs in Table 2 will be excavated. Soils that remain designated as RCRA hazardous waste would be disposed of off-site at an acceptable hazardous waste facility. Soils which are RCRA non-hazardous would remain on-site. The portion of the RCRA non-hazardous waste which leaches above drinking water standards would be disposed in an on-site RCRA Subtitle D landfill. Soils not leaching above MCLs would be placed under an engineered cap, to prevent direct contact exposure. The design and construction of the Subtitle D landfill would include components such as a low permeability cap, an underliner and a leachate collection system. Clean soil will be added to bring the bottom of the landfill to at least three feet above the seasonal high water table. The initial soil lifts will be of metal contaminated soils, and the upper lifts will be mixed VOC and metals contaminated soils.

As with the alternatives above, excavated soils that are saturated would be transported to a construction pad withcontrolled drainage (collection and treatment) and mixed with drying agents such as quicklime to absorb excess moisture and improve their physical and load bearing characteristics. In addition, VOCs would be released from the contaminated soils during the mixing process with the dewatering reagent, as well as from materials handling processes. During Remedial Design, laboratory treatability testing and field pilot studies will be conducted to gather volatilization data to predict emissions during full scale soil excavation and modification activities, and to determine the amount of VOCs remaining in the soils. Soil vapor extraction (SVE) laterals may be placed throughout the organic contaminated soils beneath the cap, unless limited volume and concentrations of VOCs remain or it is determined during remedial design that SVE would not be effective due to permeability issues. PW Cost: $11.2 million.

7.11 Alternative 4: Stabilization/Solidification

All contaminated soils that exceed Remedial Goals in Table 2 will be excavated. These soils would be treated using stabilization/solidification (S/S). The soils would be excavated, treated and consolidated on site in upland areas. Treatment effectiveness would be evaluated using TCLP tests (regular and modified), and possibly other tests (such as the ASTM Water Leach, ASTM D3987-85) and be compared to regulatory levels (RCRA hazardous, MCLs and the Action Level for lead). Treated areas would be isolated by fencing with signs, and would be covered with a cap.

The method of S/S (i.e., in-situ or ex-situ) used will depend on the contaminated depth as well as the specific characteristics of the soil and type of contamination, and will be determined during design. The term stabilization refers to the technology where a chemical agent, typically self-cementing (pozzolanic), is added to a waste to reduce the hazard potential of that waste; solidification refers to processes that convert liquid and semi-solid wastes to a solid form (monolith), typically binding contaminants mechanically in the solid matrix.

Given the present knowledge of the soil characteristics, type and depth of contamination (VOCs as wells as metals), ex-situ S/S, would most likely be the most appropriate method for treating contaminated soils, (especially for the VOC contaminated soils). It also provides a more uniform mixing of reagents with contaminated soils. In addition, the soils will be aggressively treated by aeration during the mixing process as well as from materials handling processes. During Remedial Design, laboratory treatability testing and field pilot studies will be conducted to gather volatilization data to predict emissions during full scale soil excavation and modification activities, and to determine the amount, if any, of VOCs remaining in the soils.

On a CERCLA site, treatment of RCRA materials in a vessel may potentially trigger Land Disposal Restrictions (LDRs), if levels after treatment still exceeded the Universal Treatment Standards (UTS). Because S/S may include use of a vessel, LDRs will need to be adhered to. This may also include meeting the UTSs for any underlying hazardous constituent levels for various contaminants (such as lead). PW Cost: $10.6 - 20.3 million.

7.12 Alternative 5: In Situ Treatment Followed by A) Containment: or B) Stabilization/Solidification

All contaminated soils that exceed RGs in Table 2, will be excavated. These soils would be treated using an in situ thermal treatment technology to reduce concentrations to below RGs as described on Table 2. Inorganic contaminated soils would require Stabilization/Solidification as described for Alternative 4, and/or containment as described for Alternative 3B. Treated areas would be isolated by fencing and would be covered with an engineered cap.

Potential process options for thermally treating soils include steam injection, hot air flushing, and six-phase soil heating (SPSH). According to literature, SPSH has better performance data for treating fine-textured material both in the vadose zone and below the groundwater table. Therefore this will be the only option discussed. Six-phase soil heating (SPSH) is a technique that uses common low-frequency electricity to heat soils by converting standard three-phase power to six-phase power. Electrodes are inserted into the ground in circular arrays. Each electrode is connected to a separate transformer with a separate current phase. A seventh, neutral electrode is located at the center of the array and doubles as a soil vent. As electricity is applied, the soil heats, volatilizing organic compounds which are removed through the central soil vent. Pore water in the soil is the principal conductor of electricity. This technology is a variation of radio frequency heating, using one-fifth to one-tenth the power to achieve similar results.

The selection of a preferred process option would be determined after pre-design sampling and analysis for geophysical parameters in the areas requiring treatment. Each of these areas contain different materials with varying moisture contents, and potentially different COCs at different concentration ranges. All of these factors will affect the layout of the electrode system, the heating power per unit time, and the time to remediate. Data collection programs during pre-design phases would be designed to include collection of these data. Due to the relatively high concentrations of COCs in the soils, it may also be necessary to install a temporary low permeability barrier on the surface of the ground to prevent the uncontrolled release of vapors during thermal treatment. PW Cost: $10.0 - 15.3 million.

7.13 Alternative 6: Low Temperature Thermal Desorption Followed by A) Containment; or B) Stabilization/Solidification

All contaminated soils that exceed RGs will be excavated. Those soils with the potential to leach organic COCs in excess of the MCLs would be treated ex-situ using low temperature thermal desorption to reduce concentrations below the RGs listed on Table 2. Thermal desorption processes are designed to remove the volatile and some semi-volatile organic compounds from soil, based on the volatility of the target compounds and operating temperatures of the treatment unit. Thermal desorption is different from incineration in that the soils are heated to a temperature at which the target compounds will volatilize but not to temperatures in excess of that target temperature. Normal target temperatures range from 200-10005F. The excavated soilswould be heated to the target temperature. In addition to target temperature, residence times must be sufficient to insure volatilization is complete. Residuals generated from the treatment include volatiles (VOCs) and offgas. Offgas is typically treated to remove particulates, water vapor, and volatile organics by one or more of the following methods: afterburning, activated carbon, or recovery through condensation. Depending on the type of offgas treatment used, additional residuals may be generated including spent carbon or condensed water. The spent carbon would be regenerated. Most remedial actions employing low-temperature thermal desorption use a mobile piece of equipment and complete the treatment on-site. A test run may be necessary to determine the most appropriate size of equipment, and operating temperature and residence time.

As thermal desorption does not treat inorganic-contaminated soils, they would require treatment and/or containment. These soils would either be: A) capped as otherwise described in Alternative 3B; or B) stabilized/solidified as described in Alternative 4.

Different areas on-site contain different materials with varying moisture contents, and potentially different COCs at different concentration ranges. All of these factors will affect the degree of pretreatment required for the low temperature thermal desorber feedstock, the operating temperatures, process rate, and the resulting cost. Data collection programs during pre-design phases would include collection of these data. It is common to perform pilot-scale field tests using a thermal desorber prior to establishing full-scale operating parameters. PW Cost: $22 - 27 million.

7.14 Alternative 7: Excavation and Off-Site Disposal

All contaminated soils that exceed Remedial Goals (RGs, Table 2), would be excavated and disposed off-site. Facilities may solidify the soils prior to disposal. Some of the contaminated soils from the Shuron site "pass" TCLP tests and would be classified as RCRA non-hazardous. Some of the contaminated soils, however, may "fail" the TCLP tests and would then be classified as RCRA hazardous waste. PW Cost: $11.8 million.

8.0 COMPARATIVE ANALYSIS OF ALTERNATIVES

The fourteen (14) alternatives for remediation were evaluated based upon the nine (9) criteria, described below, set forth in 40 C.F.R. º 300.430(e)(9) of the NCP. In the sections which follow, brief sumimaries of how the alternatives were judged against these criteria are presented. Seven (7) of the criteria are based on environmental protection, cost, and engineering feasibility issues. The preferred alternative is then further evaluated based on the final two criteria, State and Community acceptance.

Threshold Criteria: The first two (2) statutory requirements must be met by the alternative:

1. Overall protection of human health and the environment addresses whether the alternative will adequately protect human health and the environment from the risks posed by the Site. Included is an assessment of how and whether the risks will be properly eliminated, reduced, or controlled through treatment, engineering controls, and/or institutional controls.

2. Compliance with applicable or relevant and apropriate requirements (ARARs) addresses whether an alternative will meet all of the requirements of Federal and State environmental laws and regulations, as well as other laws, and/or justifies a waiver from an ARAR. The specific ARARs which will govern the selected remedy are listed and described in Section 9.0, the Selected Remedy.

Primary Balancing Criteria: Five (5) criteria were used to weigh the strengths and weaknesses of the alternatives. Assuming satisfaction of the threshold criteria, these five (5) criteria are EPA's main considerations in selecting an alternative as the remedy.

1. Long term effectiveness and permanence refers to the ability of the alternative to maintain reliable protection of human health and the environment over time, once the remediation goals have been met.

2. Reduction of toxicity, mobility, or volume through treatment addresses the anticipated performance of the treatment technologies that an alternative may employ. The 1986 amendments to CERCLA, the Superfund Amendments and Reauthorization Act (SARA), direct that, when possible, EPA should choose a treatment process that permanently reduces the level of toxicity of Site contaminants, eliminates or reduces their migration away from the Site, and/or reduces their volume on a Site.

3. Short-term effectiveness refers to the potential for adverse effects to human health or the environment posed by implementation of the remedy.

4. Implementability considers the technical and administrative feasibility of an alternative, including the availability of materials and services necessary for implementation.

5. Cost includes both the capital (investment) costs to implement an alternative, plus the long-term O&M expenditures applied over a projected period of operation.

Modifying Criteria: These two (2) considerations indicate the acceptability of the alternative to the public, local, or state officials.

1. State Acceptance addresses whether, based on its review of the RI/FS and the Proposed Plan, the State concurs with, opposes, or has no comments on the selected preferred alternative, or remedy.

2. Community Acceptance addresses whether the public agrees with EPA's selection of the preferred alternative. Community acceptance of the Proposed Plan was evaluated based on comments received during the public meetings and during the public comment period.

8.1 SOIL REMEDIATION ALTERNATIVES

8.1.1 Threshold Criteria

Soil Alternatives 1 (No Action) and 2 (Institutional Controls/Monitoring), do not meet the threshold criteria of protecting human health and the environment and meeting ARARs, since no remedial action is taken. There is high uncertainty whether Soil Alternative 3 (Capping with no bottom liner) will be overall protective of human health and the environment and will meet ARARs, because of the potential for contaminants to leach to the groundwater above MCLs (especially the VOCs). This is a significant concern since the water table at the Site is very shallow, about 3 feet below land surface, and much of the contaminated soil is saturated. Soil Alternative 3A may meet the threshold criteria, but there remains some uncertainty as to whether hazardous waste, as defined by RCRA, will leach from the containment system. RCRA regulations require that RCRA hazardous waste be treated to meet Land Disposal Restrictions (LDRs) Treatment Standards prior to being placed into a Subtitle D landfill (ARAR), and this alternative does not even include all the requirements of a Subtitle D landfill. Alternative 3B (Excavation and On-Site Capping with Bottom Liner for RCRA Non-Hazardous Soil and Off-Site Disposal of RCRA Hazardous Soils) would probably be adequately protective, provided the landfill was maintained indefinitely. Alternative 5 may meet the threshold criteria according to the literature; however, there is still some concern about its protectiveness since In-Situ Thermal Treatment is a relatively new technology.

The other three (3) alternatives, Alternative 4 (Stabilization/Solidification, Alternative 6 (Low Temperature Thermal Desorption followed by A) Containment; or B) Stabilization/ Solidification, and Alternative 7 (Off-Site Disposal) will meet the two (2) threshold criteria of being protective of human health and the environment and meeting ARARs. A combination of Alternative 4 with Alternative 3B, may be more overall protective than either alternative alone.

For instance, the soils could be aggressively aerated and treated using S/S to treat the metals and*most of the VOC contaminants, so that they no longer leach above MCLs. Then alternative 3B could be implemented such that those hazardous soils that continue to leach above LDR treatment standards (UTS), would be disposed of off-site. Those with TCLP leachate containing contaminant levels between LDR treatment standards and MCLs, expected to be soils containing VOCs primarily, could be placed into a RCRA Subtitle D landfill. Those soils which no longer leach above drinking water standards could be placed on the ground under an engineered cap. Thus this combination would be overall protective and meet ARARs, since the high level contamination would be removed from the Site, and any contaminants that could potentially still leach above MCLs, after aggressive treatment, but at considerably lower levels than before treatment, would be prevented from leaching into the groundwater utilizing engineering controls.

8.1.2 Primary Balancing Criteria

Soil Alternatives 1 (No Action) and 2 (institutional Controls /Monitoring, will not meet the criteria for long-term effectiveness arid permanence, since no action will be taken. There is high uncertainty that Soil Alternative 3 (Capping with no bottom liner) and some uncertainty that Soil Alternative 3A will be long-term effective for the same reasons stated above, since the groundwater is so shallow. Alternative 3B (Excavation and On-Site Capping with Bottom Liner for RCRA Non-Hazardous Soil and Off-Site Disposal of RCRA Hazardous Soils) would probably be long-term protective, under the conditions described above.

Alternatives 1, 2, 3, 3A, and 3B, do not meet the statutory preference for the reduction of toxicity, mobility, or volume through treatment. This preference directs that, when possible, EPA should choose a treatment process that permanently reduces the level of toxicity of Site contaminants, eliminates or reduces their migration away from the Site, and/or reduces their volume on a Site.

Alternative 5 may be long-term effective, but this is based on literature. It would also meet the statutory preference for treatment and permanent solutions. Alternative 4 (S/S) would be long-term effective and would meet the statutory preference for treatment.

Alternative 6 (Thermal Desorption with S/S (for the inorganic soils)) would also be long-term effective and permanent and would most satisfy the statutory preference for treatment, since both the organic and inorganic (metals) contaminants would be treated. Thermal treatment with on-site containment of the metals soils may be less long-term permanent than S/S of the metals soil, and would not satisfy the preference for treatment as well as treating both the metals and organic soils. As described above, a combination of Alternatives 4 and 3B, may be more long-term effective and permanent than either alternative alone.

Alternative 7 (Off-site disposal) would be long-term effective and permanent in that the contaminated soil would be removed from the site. Also, approved off-site disposal facilities are typically secured, have personnel onsite to prevent trespassing, are currently regulated, and already conduct monitoring. This alternative may also partially satisfy the preference for treatment if the off-site facility solidifies the soil prior to placement into the landfill.

Balancing criteria also include implementability and short-term risks. The alternative with the greatest implementability difficulties and highest short term risk would be Alternative 6, Thermal Desorption, due to the saturated clayey soils and the complexity of the treatment unit. Alternative 4 (S/S) may have some implementability difficulties for the same reasons, and also may have a slightly higher short term risk than Alternatives 3 to 3B (Containment), as well as Alternative 7 (Off-site disposal), since no treatment is involved in the alternatives. Alternative 5 (In-situ thermal treatment) would not pose as much of a short term risk as Alternatives 4 (S/S) and 6 (Ex-situ thermal) but more than 3 to 3B (Containment) and 7 (Off-site disposal). There would, however, be implementability difficulties due to the saturated clayey soils.

Cost, and cost-effectiveness, is a factor to be considered. The least expensive alternatives (besides 1 and 2) are 3 ($7.7 million) and 3A ($9.0 million). The costs of Alternatives 3B, 4, 5, and 7 are very similar, approximately $11 to 12 million. The cost of Alternative 4 could increase above this amount if special additives are needed to treat the VOCs in the soil (up to approximately $20 million). Alternative 6 costs significantly more than all the other alternatives, up to approximately $27 million.

A combination of Alternatives 3B and 4 provides a more cost-effective and protective alternative than each of the alternatives alone, since the soils are aggressively treated with S/S and aeration, though not necessarily with high cost additives such as organoclays or proprietary mixtures. In this case, those soils that continue to leach above MCLs (but below RCRA hazardous levels), could be placed into a RCRA Subtitle D landfill to prevent leaching of contaminants to groundwater. RCRA hazardous soils would be disposed off-site.

8.1.3 Modifying Criteria

1. State acceptance: The State of South Carolina concurs with the soil remedy, though not with the future use industrial RG for lead. A copy of South Carolina's letter of concurrence is attached as Appendix B to this ROD.

2. Community acceptance: Local officials have stated at the two public meetings that they would prefer that the contaminated soils be taken off-site because their long range vision may include the possible conversion of the property to athletic fields, if they can find a way to fund the raising of the on-site building. However, they have also indicated less concern about how the area of the site that is near the rear of the building, where the wastewater lagoons and solids ponds are located, is used. This is the area that EPA envisions the contaminated soils will be placed after treatment. In addition, the remedy also allows for the material to be taken off-site, if it is determined to be more cost effective. Verbal comments were received at the Shuron Site Proposed Plan public meeting, held on December 9, 1997 and the second public meeting held on January 22, 1998. The public comment period opened on December 5, 1997 and closed on February 4, 1998 (after a thirty (30) day extension). Written comments received concerning the Site, and those comments expressed at the public meeting, are addressed in the Responsiveness Summary attached as Appendix A to this ROD.

8.2 Groundwater Remediation Alternatives

8.2.1 Threshold Criteria

Groundwater Alternatives 1 (No Action) and 2 (Limited Action) do not meet the threshold criteria of protecting human health and the environment and meeting ARARs. Alternative 4 (Groundwater Extraction and Treatment at the source area) will meet this criteria for most of the contaminated groundwater, but may not meet it for the portion of the contaminated groundwater that may be located beyond the extraction system, and therefore, not addressed by active remediation. The other two alternatives, Alternative 3 (Source Removal with Temporary Groundwater Extraction for Dewatering, Data Collection/Aquifer Evaluation, Active Groundwater Treatment of all remaining (after dewatering) contaminated groundwater, and if applicable, Monitored Natural Attenuation), and Alternative 5 (Groundwater Extraction and Treatment near the property boundary) are expected to meet the two (2) threshold criteria of being protective of human health and the environment and meeting ARARs.

8.2.2 Primary -Balancing Criteria

Alternative 1, No Action, and Alternative 2, Limited Action will not provide long term effectiveness, since no treatment is performed. Alternative 4 (Groundwater Extraction and Treatment at the source area) will be long-term effective and permanent for most of the contaminated groundwater, but may not meet this criteria for the portion of the contaminated groundwater that has already migrated past the extraction system. The other two (2) alternatives, Alternative 3 (Source Removal with Temporary Groundwater Extraction for Dewatering, Data Collection/Aquifer Evaluation, Active Groundwater Treatment of all remaining (after dewatering) contaminated groundwater, and if applicable, Monitored Natural Attenuation), and Alternative 5 (Groundwater Extraction and Treatment near the property boundary) are expected to be long-term effective and permanent.

The Superfund Amendments and Reauthorization Act of 1986 (SARA) requirements favor active remediation of contaminated groundwater. Alternatives 1 and 2 involve no treatment, or limited treatment. Therefore, these alternatives do not satisfy the statutory preference for selecting remedial actions that employ treatment technologies that permanently and significantly reduce the toxicity, mobility, or volume of the contaminants. Alternatives 3, 4, & 5 meet the criteria of reducing the toxicity, mobility, and volume of contamination through treatment. Alternatives 3 and 5 will treat more of the contaminated groundwater since all of the groundwater would be treated.

Alternatives 1 & 2, No Action and Limited Action, afford the greatest level of short-term protection because they present the least risk to remedial workers, the community, and the environment, as these alternatives do not involve a remedial action or only a limited one during the source removal. The other Alternatives, numbers 3, 4 & 5, could release minimal volatile emissions during construction of the extraction system installation and/or treatment system construction. Standard construction management techniques would address any potential short-term fugitive emissions.

Alternatives 1 (No Action) and 2 (Limited Action) would be the easiest to implement. The construction technologies required to implement Alternatives 3, 4, & 5, are well established and very reliable. The extraction and treatment systems would have additional operational requirements compared to Alternatives 1 and 2, because of the complexities of the continuous operation of a groundwater extraction system, the operation of a multi-component treatment: system, and requisite discharge limits on the resulting treated effluent. The technical implementability of all the evaluated alternatives is reasonable. Technologies required to implement the alternatives are readily available and proven at full-scale in similar field efforts. Discharge permits, or at least the criteria, may need to be obtained or met, for the implementation of Alternatives 3 - 5, since they include an on-site treatment system which may discharge to the unnamed stream or into the groundwater.

5. Cost includes both the capital (investment) costs to implement an alternative, plus the long-term O&M expenditures applied over a projected period of operation. Alternative 1 has no capital costs since it is considered completed. Alternative 2 is lower in cost than Alternatives 3 and 4, since it involves only the costs of dewatering during the source removal and of monitoring the groundwater, and implementing deed and well restrictions. Alternatives 4 and 5 are similar in costs, about $4.7 million. Alternative 3 may cost less if natural attenuation (MNA) is approved for use by EPA on appropriate portions of the plume. This will require a demonstration during RD/RA, to EPA's satisfaction, that MNA is occurring and can be relied upon to effect treatment as effectively and within a similar time frame as active treatment.

8.2.3 Modifying Criteria

1. State acceptance: The State of South Carolina concurs with this remedy. A copy of South Carolina's letter of concurrence is attached (Appendix B) to this ROD.

2. Community acceptance was indicated by the verbal comments received at the Shuron Site Proposed Plan public meeting, held on December 9, 1997. The public comment period opened on December 5, and closed on February 4, 1998 (after a thirty (30) day extension). Written comments received concerning the Site, and those comments expressed at the public meeting, are addressed in the Responsiveness Summary attached as Appendix A to this ROD.

9.0 THE SELECTED REMEDY

Based upon consideration of the requirements of CERCLA, the NCP, the detailed analysis of alternatives and public and state comments, EPA has selected a remedy that addresses soil and groundwater contamination at this Site. At the completion of this remedy, the risk remaining at this Site will be within EPA's acceptable risk range of 1 X 10 -4 to 1 X 10 -6, which is considered protective of human health and the environment.

The selected remedy for this Site is:

> Soil Remediation: Alternatives 3B & 4: Off-site disposal of RCRA hazardous waste and for RCRA non-hazardous waste - S/S and placement into an on-site RCRA Subtitle D landfill (if contaminants leach above drinking water standards after S/S and under an engineered cover if soils do not leach above drinking water standards); Off-site disposal, if it is determined to be more cost-effective for all or some ofthe RCRA non-hazardous soils.
>
> Groundwater Remediation: Alternative 3: Source Removal with Temporary Groundwater Extraction for Dewatering, Data Collection/ Aquifer Evaluation, Active Groundwater Treatment of contaminated groundwater, and if applicable, Monitored Natural Attenuation.

The estimated total present worth cost of the soil remedy is $11 - 15 million and the estimated total present worth cost for the groundwater remedy is $ 2.4 - 5.0 million.

9.1 Soil Remediation

A general description of this cleanup option follows, while a more detailed description is presented below in Section 9.1.1.

Combination of Soil Alternatives 3B and 4: All soils, surface and subsurface soils and sediments, including the uplands and wetlands, exceeding their respective RGs, shall be excavated, except for approximately 13 acres in the Eastern Wetlands. The excavated/disturbed wetlands shall then be restored.

After this, whatever soils are determined to be RCRA hazardous waste (unless treatment as described below renders the soils as RCRA non-hazardous), shall be disposed off-site at an acceptable hazardous waste facility.

All soils that are designated as RCRA non-hazardous (including those so designated after treatment), may remain on-site. Soils that remain on-site will be aggressively treated using S/S and aeration to reduce the contaminant concentrations, such that the contaminants do not leach out of the soils above drinking water standards. Pilot-scale treatability testing will be conducted during RD/RA to determine the most effective reagent mixture to prevent leaching of contaminants above drinking water standards. If, after aggressive treatment, the RCRA non-hazardous waste continues to leach above MCLS, the waste will be disposed of in an on-site RCRA Subtitle D landfill. Soils not leaching above MCLs, would not require placement in an on-site RCRA Subtitle D landfill, but will be placed under an engineered cap to prevent direct contact exposure.

If it is determined during RD/RA, that it would be more cost effective to take soils that leach above MCLs off-site, then Alternative 7 (Off-Site Disposal) may be implemented versus a combination of Alternatives 3B and 4.

9.1.1 Description

All contaminated soils, surface and subsurface soils and sediments, including uplands and wetlands, which exceed the Rgs listed in Table 2, shall be excavated, except for some sediments in the eastern wetlands (approximately 13 acres). The upland surface soils shall be excavated to the RG levels for a future industrial worker. The surface and subsurface soils in the upland areas and the wetland areas, shall be excavated to the RG levels for the protection of groundwater, and the wetland sediments shall also be excavated to the RG levels for the protection of ecological receptors. The excavated/disturbed wetlands will then be restorated. These areas include: the upland soils, which may possibly include soils outside the fence east of the two Solid Ponds but west of the wetlands boundary (as depicted on Figure 3 but only after confirmational sampling), the Northern Drainage Ditch (as depicted on Figure 3), and the Southern Wetlands, including the South Ditch and the southeast corner (beginning at the corner of the most southern fence line and continuing southeasterly to the South Ditch area).

All soils that are designated as RCRA hazardous waste will be disposed of off-site at an acceptable hazardous waste facility, unless treatment as described below, causes the waste to no longer be considered RCRA Hazardous. This soil may remain onsite, if it meets the Land Disposal Restriction Standards. RCRA designation will be determined from RCRA TCLP tests.

Soils which would be designated as RCRA non-hazardous, may remain on-site. If the soils remain on-site, they will be aggressively treated by aeration and S/S such that the contaminants do not leach from the soils above MCLs or the action level for lead (drinking water standards). The term stabilization refers to the technology where a chemical agent, typically self-cementing (pozzolanic), is added to a waste to reduce the hazard potential of that waste; solidification refers to processes that convert solid wastes to a solid form (monolith), typically binding contaminants mechanically in the solid matrix. Given the present knowledge of the soil characteristics, type and depth of contamination, it is expected that ex-situ S/S will be the most appropriate method for treating contaminated soils at the Shuron Site to prevent leaching of contaminants into the groundwater above drinking water standards. The most effective S/S reagent mixture at preventing the leaching of contaminants to groundwater above the federal and state drinking water standards, will be determined from pilot-scale treatability studies conducted during RD.

Following treatment, soils that do not leach above drinking water standards, will be placed under an engineered cap to prevent direct contact exposure. However, these soils that do not leach above drinking water standards, could be placed into the Subtitle D landfill if it is more cost-effective than constructing a separate engineered cap. Those soils which continue to leach above drinking water standards after aggressive treatment (this is expected to be only soils with VOC contamination), will be disposed of in a RCRA Subtitle D landfill to be constructed on-site. In order to be placed into the RCRA Subtitle D landfill, the soils will have to comply with LDR requirements.

The design and construction of the Subtitle D landfill would include components such as a low permeability cap, a bottomliner and a leachate collection system. Clean soil will be added to bring the bottom of the landfill to at least three feet above the seasonably high water table. The initial soil lifts will be of treated metal contaminated soils, and the upper lifts will be of treated mixed VOC and metals soils.

Those soils to be excavated that are wet, would be transported to a construction pad with controlled drainage (collection and treatment) and mixed with drying agents such as quicklime, if necessary, to absorb excess moisture and improve their physical and load bearing characteristics. Since the soils will be treated with S/S reagents, the drying agent prior to treatment, as described for the other alternatives, may not be necessary. In addition, all soils containing VOCs, will also be aggressively treated by aeration to release the VOCs during the mixing process with the reagent, as well as from materials handling processes. During Remedial Design, laboratory treatability testing and field pilot studies will be conducted for the following purposes: (1) determining the most effective reagent mixture and (2) to gather volatilization data to predict emissions during full scale soil excavation and modification activities to ensure that State and Federal air emission standards are not being exceeded. In addition, the amount of contaminants that remain in the soils after treatment will be determined in order to determine whether the soils may remain on-site or whether they would need to be disposed off-site at an appropriate hazardous waste facility.

Treatment effectiveness would be evaluated using tests such as RCRA TCLP test procedures (to determine RCRA Hazardous) and modified TCLP testing using site background groundwater to determine if drinking water standards are met. Leachate tests will include testing of treated material that has cured for 28 days. Other tests may also be utilized for determining if drinking water standards are being met (such as the ASTM water leach test or EPA 1312 test), if EPA determines that these tests would more accurately portray site conditions. The leachate results will then be compared to drinking water standards. Treated areas will be isolated and restricted to prevent exposure by trespassers and potential future workers. This will include utilizing fencing with signs placed at regular intervals.

The footprint of the landfill and any areas which have treated soils (soil that does not need to be placed in the landfill since contaminants do not leach from the soil above drinking water standards), will be large enough to limit the height of the landfill (or area of treated soils) as much as possible, but not to exceed ten feet high above the current land surface, such that it is not a visible eyesore or impediment.

During excavation and treatment, air emissions/odors shall be monitored on-site and at the property boundary. If there are complaints from the nearby residents concerning emissions/ odors, they shall be suppressed or, if suppression is not effective, collected. If health based levels or State/Federal regulatory levels are exceeded, then the emissions shall be collected.

If it is determined during RD or RA, that it would be more cost effective to take all or some portion of the RCRA non-hazardous soils off-site for disposal, then Alternative 7 (Off-Site Disposal) may be implemented versus a combination of Alternatives 3B and 4.

Three VOC contaminants; ethyl benzene, toluene, and xylenes (total), bis-2-ethlhexyl phthalate, and lead, may have their Rgs reevaluated, if determined necessary by EPA for the protection of groundwater, during RD/RA. If so, these numbers shall be established using the RCRA TCLP test and/or a modified TCLP test using site background groundwater, consistent with the methods employed during the RI/FS.

In addition, institutional controls would be implemented and a fence would be constructed around the area with the treated soils and the landfill. The institutional controls would also include a deed or other restriction limiting uses and activities of those portions of the property in which soils exceeding RGs have been left in place as well as the areas of treated soils. The deed restriction would serve as notification to potential purchasers or developers of the property that land use is restricted in these areas and the location of the untreated soils.

Fencing commonly used to limit access is 6 or 8-foot high chain-link; barbed wire would be strung along a top brace as an additional deterrent to trespassers. Signs would be posted at regular intervals, warning the trespasser of the potential danger.

Routine inspection is required to maintain the fence, the landfill, and the cap areas.

9.1.2 Applicable or Relevant and Appropriate Requirements (ARARs)

Applicable Reauirements. Soil remediation shall comply with all applicable portions of the following Federal and State of South Carolina regulations:

49 CFR Parts 107, 171-179, promulgated under the authority of the Hazardous Materials Transportation Act. Regulates the labeling, packaging, placarding, and transport of hazardous materials offsite.

40 CFR Parts 258, 261, 262.11, 262 (Subparts A-D), 263, 264, and 268, promulgated under the authority of the Resource Conservation and Recovery Act. These regulations govern the identification, transportation, manifestation, and land disposal requirements of solid and hazardous wastes. If the contaminated soils fail TCLP, the land disposal restrictions in 40 CFR Part 268 will apply. However, if TCLP toxicity tests are performed and the contaminated soils do not exceed TCLP toxicity limits, then the land disposal restrictions in 40 CFR Part 268 will not apply. In the event that the Site soils requiring remediation do not test hazardous (i.e., do not fail TCLP), the regulations listed here will be considered relevant and appropriate rather than applicable.

40 CFR 6 Appendix A (Protection of Floodplains), 16 USC et seq. (Fish and Wildlife Coordination Act) 40 CFR 6.302. Requirements to be met by remedial actions that occur in a floodplain.

16 USC 1271 et seq. (Fish and Wildlife Coordination Act). Requirements for measures to be taken to prevent, mitigate, or compensate for losses of fish and wildlife resources.

Clean Water Act Section 404; 40 CFR 230, 33 CFR 320-330. 40 CFR 6, Appendix A. Requirements for actions taken in a wetlands. U.S. Amy Corps of Engineers define wetlands and issue permits.

SCHWMR 61-79.124, .261, .2621 .263, .264, .266 and .268, South Carolina Hazardous Waste Management Regulations, promulgated pursuant to the Hazardous Waste Management Act, SC Code of Laws, 1976, as amended. Establishes criteria for identifying and handling hazardous wastes, as well as land disposal restrictions.

South Carolina Non-Hazardous Waste Management Regulations, South Carolina Code of Regulations (Chapter 61.61). Regulations require capping of non-hazardous, land disposal units.

South Carolina Solid Waste Policy and Management Act of 1991; South Carolina Code of Laws, Title 44. Applies to treatment residuals that are not classified as hazardous waste.

Relevant and Appropriate Requirements. The following regulations are "relevant and appropriate" to source control actions (soil remediation) at the Shuron Site. Applicability of these air quality control regulations is due to the potential for release of harmful particulates (metals) or VOCs during soil excavation and handling activities.

40 CFR Parts 60, 61, and 70, promulgated under the authority of the Clean Air Act. Included are the National Emissions Standards for Hazardous Air Pollutants (NESHAPs). Ambient air quality standards and standards for emissions to the atmosphere fall under these regulations.

SC Reg. 61-62, South Carolina Air Pollution Control Regulations and Standards, promulgated pursuant to the S.C. Pollution Control Act, SC Code of Laws, 1976, as amended. Establishes limits for emissions of hazardous air pollutants and particulate matter, and establishes acceptable ambient air quality standards within South Carolina.

29 CFR 1910 and 1926: OSHA Health and Safety Requirements. Applies to all workers engaged in Remedial Activities.

40 CFR 264: RCIZA regulations for the handling and placement of hazardous waste.

"To Be Considered" and Other Guidance.

Revised Procedures for Planning and Implementing Off-site Response Actions, OSWER Directive 9834.11, November 1987. This directive, often referred to as "the off-site policy," requires EPA personnel to take certain measures before CERCLA wastes are sent to any facility for treatment, storage, or disposal. EPA personnel must verify that the facility to be used is operating in compliance with º 3004 and º 3005 of RCRA, as well as all other federal and state regulations and requirements. Also, the permit under which the facility operates must be checked to ensure that it authorizes (1) the acceptance of the type of wastes to be sent, and (2) the type of treatment to be performed on the wastes.

40 CFR Part 50, promulgated under the authority of the Clean Air Act. This regulation includes the National Ambient Air Quality Standards (NAAQS), and establishes a national baseline of ambient air quality levels. The state regulation which implements this regulation, South Carolina Reg. 62-61, is applicable to the source control portion of the remedy.

Various TBC materials were utilized in the Baseline Risk Assessment and in the Feasibility Study. Because cleanup standards were established based on these documents, they are considered TBC.

In the Baseline Risk Assessment, TBC material included information concerning toxicity of, and exposure to, Site contaminants. TBC material included the Integrated Risk Information System (IRIS), Health Effects Assessment Summary Tables (HEAST), and other EPA guidance as specified in the Baseline Risk Assessment.

In the FS, soil concentrations protective of human health and the environment were calculated based on the Site-specific risk calculations from the Baseline Risk Assessment, using TBC information as described above. These levels are established as performance standards in the following section. There are no established federal or state standards for acceptable levels of Shuron Site contaminants in surface or subsurface soils.

The protective levels for surface soils and sediments were established for contaminants, based on the Baseline Risk Assessment calculations, and toxicity studies. These RGs are listed on Table 2. The protective level for lead (Pb) is 400 mg/kg for a future residential scenario and 1150 mg/kg for a future industrial scenario for surface soils. These RGs are designated TBC.

Subsurface soil protective levels (RGs) for the contaminants listed on table 2 were based on the results of leaching tests using Site-specific samples, conducted during the RI. The contaminants listed in Table 2 show those contaminants in the subsurface soil samples which violated drinking water standards; and therefore, had RGs established. These RGs are TBC.

Other requirements. Remedial design often includes the discovery and use of unforeseeable, but necessary, requirements, which result from the planning and investigation inherent in the design process itself. Therefore, during design of the source control component of the selected remedy, EPA may, through a formal ROD modification process such as an Explanation of Significant Differences or a ROD Amendment, elect to designate further ARARs which apply, or are relevant and appropriate, to this portion of the remedy.

9.1.3 Performance Standards

The standards outlined in this section comprise the performance standards defining successful implementation of the remedy. The soil remediation goals in Table 2 below, shall be the performance standards for soil excavation. The future industrial RGs apply to the uplands surface soils; protection of groundwater RGs apply to both uplands and wetlands surface soils, subsurface soils, and sediments; and ecological RGs apply to wetland sediments.

Whatever soils are determined to be RCRA hazardous waste (unless treatment renders the soils as RCRA non-hazardous), shall be disposed off-site at an acceptable hazardous waste facility. All soils allowed to remain on-site shall be treated such that the soils do not leach contaminants above drinking water standards. Following treatment, soils that do not leach above drinking water standards, will be placed under an engineered cap to prevent direct contact exposure. Those soils which continue to leach above drinking water standards (this is expected to be only soils with VOC contamination), will be disposed of in a RCRA Subtitle D landfill to be constructed on-site. Soils placed into the RCRA Subtitle D landfill shall comply with LDR requirements.

The levels of contamination detected in the leachate from the RCRA TCLP test that: would render a waste as RCRA Hazardous by characteristic are as follows: lead greater than or equal to 5.0 ppm, TCE greater than or equal to 0.5 ppm, PCE greater than or equal to 0.7 ppm. For soils that have mixed metals and VOC contaminants, the concentration of lead in the the leachate would have to meet the Universal Treatment Standard of 0.75 ppm or below, since it be would an underlying hazardous constituent.

9.1.4 Monitoring

Additional soil samples will be collected from around the wastewater lagoons and solids ponds and other uplands areas, and additional surface and subsurface soil samples and sediment and surface water samples, will be collected from the southern wetlands and southeast corner to further characterize the extent of contamination.

Real-time air monitoring will be conducted in several places along the property boundary, especially in the direction of nearby residents. In addition, air monitoring shall be conducted for determining if air standards are being met and for protection of workers.

9.2 Groundwater Remediation

A general description of this cleanup option follows, while a more detailed description is presented below in Section 9.2.1. This remedy consists of groundwater treatment using either; pump & treat, air-sparging (trenches and/or wells), recirculation wells or a combination, followed by discharge to Turkey Creek, POTW, or reinjection (for extracted groundwater). If it is shown during the evaluation period that natural attenuation is occurring, and would remediate the contaminated groundwater within a similar time frame as active remediation, then this may be implemented for the appropriate portions of the plume. The following subsections describe this remedy component in detail, provide the criteria (ARARs and TBC material) which shall apply, and establish the performance standards for implementation.

9.2.1 Description

This remedy component consists of the design, construction and operation of a groundwater treatment system throughout the groundwater contaminant plume, and development and implementation of a Site monitoring plan to monitor the system's performance. The groundwater alternative specified below shall be continued until the performance standards listed in Section 9.2.3. are achieved continuously, at a minimum, in all of the existing and new monitoring and extraction wells, that are or will be associated with the Site.

Some of the contaminated soils to be excavated during the source removal (as described in Soil Alternative 3B) will be below the water table so that those areas will need to be dewatered during excavation. A temporary groundwater recovery and treatment system will be used for dewatering purposes during the source removal. For this alternative, the system will be operated for an additional four to six months after completion of the excavation of the contaminated soil.

An evaluation period for gathering data to design a proactive groundwater treatment system (pump and treat, recirculation wells, air-sparging (trenches and/or wells), or a combination) to achieve RGs throughout the entire groundwater plume, will be conducted before, during and after the excavation of the contaminated soil. This would most likely require that some of the aquifer characteristic data be collected outside the areas of the soil excavation (undisturbed areas) that would more accurately portray conditions for the entire groundwater plume. This should especially include those areas outside the source removal areas that have shown higher concentrations of groundwater contamination that most likely would be the target of groundwater remediation.

During the evaluation period, if monitored natural attenuation (MNA) can be demonstrated (in accordance with EPA's guidance documents), to be as effective as active remediation (i.e. it is occurring, and within a similar time frame as active remediation), then this approach may be applied to the appropriate portions of the contaminated groundwater plume. The more aggressively the groundwater dewatering system is applied both within the excavation areas and the adjacent impacted groundwater areas during the evaluation period, the more contaminant mass would be removed, thus providing additional argument for the applicability of MNA. If this occurs, a ROD Amendment or ESD will be performed, if determined necessary by EPA or SCDHEC. This evaluation period will be completed within six months of the shutdown of the temporary dewatering system. This will be followed by construction and operation of the groundwater system.

In addition to the process described above, this alternative will include implementation of all of the institutional controls and contaminant monitoring requirements described below, thereby monitoring the effectiveness of the alternative and limiting future use of groundwater until clean-up goals are achieved. Institutional controls that would apply to the Site, include deed restrictions and well permit restrictions. Deed restrictions would prevent the future use of the contaminated groundwater for purposes such as potable water supply or irrigation of edible garden vegetables. These restrictions will be written into the property deeds to inform future property owners of the possibility of contaminated groundwater beneath the property. Permit restrictions, issued by the State of South Carolina, would restrict all well drilling permits issued for new wells on the Site property that may draw water from the contaminated groundwater for potable water use or irrigation of edible vegetables.

Monitoring of contaminants of concern and their degradation contaminants, not including their innocuous compounds, would be included as part, of this alternative, at a minimum. EPA may require additional contaminants, including all TCL/TAL parameters, to be analyzed. Monitoring of the contaminants would involve the collection and analysis at regular intervals, of groundwater samples from existing and new Site monitoring wells and, extraction wells (if installed), and surface water samples, to allow tracking of contaminant concentrations and to monitor the speed, direction, and extent of contaminant migration. The actual number and location of well and surface water samples, and any additional contaminants to be analyzed for, will be determined during the remedial design/remedial action phases.

Samples will be collected and analyzed for contaminants of concern and their degradation contaminants, at a minimum, however, of once every year, when the highest contamination is detected, unless a different frequency or time of the year is required by EPA. Surface water samples, from the wetlands as well as the drainage ditches, will be collected during the months when the wetlands are the most wet (around March), unless EPA designates another time of the year. In addition, the need for any additional monitoring wells, which may be sampled for additional contaminants, will be determined during the remedial design/remedial action phases. These wells may be added if it is determined later that, further characterization of the Site is needed, there is data gaps, that groundwater contamination has left the Site property, or that contamination is significantly above the clean-up criteria in the outer monitoring wells. It is anticipated that additional monitoring wells will be required to be installed between Solid Lagoon 2 and the railroad bed for further plume delineation, as well as the replacement of those wells that are abandoned during the excavation of the contaminated soils.

The vertical extent of groundwater contamination will be confirmed and/or updated during the remedial design. This may require that additional monitoring wells, screened at various depths, be installed. This will be determined by EPA during the remedial design/remedial action phases. The goal of this remedial action is to restore groundwater to its beneficial use as a drinking water source. Based on the information collected during the RI, and on a careful analysis of all remedial alternatives, EPA and the State of South Carolina believe that the selected groundwater remedy, Alternative 3, will achieve this goal.

If it is determined, on the basis of the preceding criteria and the system performance data (after all attempts have been made as determined by EPA), that certain portions of the aquifer cannot be restored to their beneficial use, all or some of the following measures involving long-term management may occur, for an indefinite period of time, as a modification of the existing system:

- engineering controls which will provide containment measures;
- chemical-specific ARARs will be waived for the cleanup of those portions of the aquifer based on the technical impracticability of achieving further contaminant reduction;
- institutional controls will be provided/maintained to restrict access to those portions of the aquifer that remain above remediation goals;
- continued monitoring of specified well locations; and
- periodic re-evaluation of remedial technologies for groundwater restoration.

The decision to invoke any or all of these measures may be made during a review of the remedial action, which will occur at least every five (5) years, in accordance with Section 121(c) of CERCLA, 42 U.S.C. º 9621(c).

9.2.2 Applicable or Relevant and Appropriate Requirements (ARARs)

Applicable Requirements. Groundwater remediation shall comply with all applicable portions of the following Federal and State of South Carolina regulations: SC Reg. 61-68, South Carolina Water Classifications and Standards. These regulations establish classifications for water use, and set numerical standards for protecting state waters.

SC Reg. 61-71, South Carolina Well Standards and Regulations, promulgated under the Safe Drinking Water Act, SC Code of Laws, 1976, as amended. Standards for well construction, location and abandonment, are established for remedial work at environmental or hazardous waste sites.

Relevant and Appropriate Requirements. The following regulations are relevant to groundwater remediation at the Site.

40 C.F.R. Parts 141-143, National Primary and Secondary Drinking Water Standards, promulgated under the authority of the Clean Water Act. These regulations establish acceptable maximum levels of numerous substances in public drinking water supplies, whether publicly owned or from other sources such as groundwater. Maximum Contaminant Levels (MCLs) are specifically identified in 40 C.F.R. º 300.430(e)(2)(i)(B) of the NCP as a remedial action objective for groundwater that is a current or potential source of drinking water. Therefore, MCLs are relevant and appropriate as criteria for groundwater remediation at this Site.

SC Reg. 61-58, South Carolina Primary Drinking Water Regulations, promulgated pursuant to the Safe Drinking Water Act, SC Code of Laws, 1976, as amended. These regulations are similar to the federal regulations described above, and are relevant and appropriate as remediation criteria for the same reasons set forth above.

Criteria "To Be Considered" (TBC) and Other Guidance. TBC criteria were utilized and/or established in the BRA and in the FS. Groundwater cleanup standards were established based on these documents and both are thus considered TBC.

In the Baseline Risk Assessment, TBC material used included information concerning toxicity of, and exposure to, Site contaminants. Sources of such data included the Integrated Risk Information System (IRIS), Health Effects Assessment Summary Tables (HEAST), and EPA guidance as specified in the BRA.

Other TBC material include the following:

Guidelines for Groundwater Use and Classification, EPA Groundwater- Protection Strategy , U.S. EPA, 1986. This document outlines EPA's policy of considering a site's groundwater classification in evaluating possible remedial response actions. The groundwater at the Site is classified by EPA as Class IIB and by South Carolina as Class GB groundwater, indicating its potential as a source of drinking water.

Other requirements. As described above in Section 9.2.2, remedial design often includes the discovery and use of unforeseeable but necessary requirements. Therefore, during design of the groundwater component of the selected remedy, EPA may, through a formal ROD modification process such as an Explanation of Significant Differences or a ROD Amendment, elect to designate further ARARs which apply, or are relevant and appropriate, to groundwater remediation at this Site.

9.2.3 Performance Standards

The standards outlined in this section comprise the performance standards defining successful implementation of the remedy. The groundwater remediation goals in Table 2 below shall be the performance standards for groundwater treatment.

9.2.4 Monitoring

Monitoring of contaminants of concern and their degradation contaminants, not including their innocuous compounds, will be included as part of this alternative, at a minimum. EPA may require additional contaminants, including all TCL/TAL parameters, to be analyzed. Monitoring of the contaminants would involve the collection and analysis at regular intervals, of groundwater samples from existing and new Site monitoring wells and extraction wells, and surface water samples, to allow tracking of contaminant concentrations and to monitor the speed, direction, and extent of contaminant migration. The actual number and location of well and surface water samples, and any additional contaminants to be analyzed for, will be determined during the remedial design/remedial action phases

Samples will be collected and analyzed for contaminants of concern and their degradation contaminants, at a minimum, however, of once every year, when the highest contamination is detected, unless a different frequency or time of the year is required by EPA. Surface water samples, from the wetlands as well as the drainage ditches, will be collected during the months when the wetlands are the most wet (around March), unless EPA designates another time of the year. In addition, the need for any additional monitoring wells, which may be sampled for additional contaminants, will be determined during the remedial design/remedial action phases. These wells may be added if it is determined later, that further characterization of the Site is needed, that there are data gaps, that groundwater contamination has left the Site property, or that contamination is significantly above the clean-up criteria in the outer monitoring wells. Currently EPA anticipates that this will include any existing wells that are abandoned during the source removal, as well as, several south of Solid Lagoon #2, in the Southern Wetlands, between Solid Lagoon #2 and the southern drainage ditch to better define the extent of the groundwater plume.

The vertical extent of groundwater contamination will be confirmed and/or updated during the remedial design. This may require that additional monitoring wells, screened at various depths, be installed. This will be determined by EPA during the remedial design/remedial action phases. The goal of this remedial action is to restore groundwater to its beneficial use as a drinking water source. Based on the information collected during the RI, and on a careful analysis of all remedial alternatives, EPA and the State of South Carolina believe that the selected groundwater remedy, Alternative 3, will achieve this goal.

For the purposes of the evaluation period and monitored natural attenuation demonstration, the following shall be performed until the evaluation period and MNA demonstration is complete: Obtain baseline water level and analytical data for the natural attenuation demonstration. Water level data will be obtained from monitoring wells, the municipal well, and any wetland, surface water or standing water at or near the site. This baseline data shall be obtained prior to the source removal. Quarterly analytical sampling and water level measurements shall then continue after this time, from monitoring wells and surface water locations, until after the evaluation period is completed; when EPA accepts as; final, the report for the evaluation period. Monitoring well and surface water samples (including water level measurements) shall be collected at the same time. The groundwater samples from the monitoring wells shall also be collected at that time. Also, monthly rainfall and temperature data shall be obtained.

In addition, for the purpose of the natural attenuation demonstration, the following parameters shall also be analyzed for: Chlorides, ethene, methane, dissolved oxygen (DO), nitrate, nitrite, iron(lll), iron(ll), sulfide, biological oxygen demand (BOD), sulfate, oxidation reduction potential, and arsenic. These parameters ruLy be revised, if EPA determines that other or less parameters are needed for the NA demonstration.

After the completion of the evaluation period, water level measurements will be collected annually with the sampling of the monitoring wells and the municipal well.

EPA may require that samples be analyzed for all TAL/TCL parameters, from all the monitoring and extraction wells (if installed), the nearest municipal well, and the surface water, for the five-year reviews.

When EPA believes that the remedial action is complete (groundwater contamination is below RGs), EPA may require that all the monitoring wells and extraction wells be sampled for all TAL/TCL parameters, at a frequency to be determined by EPA.

Other Requirements

Due to the fact that VOCs were detected in the nearby municipal well in the past, although they were very low levels, this well shall be sampled annually, until EPA determines a less frequent time frame, to ensure the contaminated groundwater does not pose a risk to the well in the future. Drinking water sampling techniques, as stated in EPA's SOP (Standard Operating Procedures) Manual, shall be used for the municipal well (detection limits for VOCs would be 1 part per billion).

9.3 Documentation of Changes

There was a change made to the selected remedy from the time the Proposed Plan was released for public comment to the time of the final selection of the remedy. The change involves revising the universal treatment standard for lead. This change is due to new LDR regulations (already an ARAR), finalized in the May 26, 1998 Federal Register. The new requirements changed the Universal Treatment standard for lead to 0.75 ppm. For soils mixed with VOCs and lead, the lead is an underlying hazardous constituent and the maximum concentration that lead may leach at in order for the contaminated soil to be disposed of into the on-site RCRA Subtitle D landfill is now 0.75ppm (leachate). The previous level stated in the Proposed plan of 0.370 ppm no longer applies. Therefore, the ROD will reflect this revised criteria.

10.0   STATUTORY DETERMINATIONS

The selected remedy for this Site meets the statutory requirements set forth at Section 121(b)(1) of CERCLA, 42 U.S.C.º 9621(b)(1). This section states that the remedy must protect human health and the environment; meet ARARs (unless waived); be cost-effective; use permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and finally, wherever feasible, employ treatment to reduce the toxicity, mobility or volume of the contaminants. The following sections discuss how the remedy fulfills these requirements.

Protection of humal health and the environment: The groundwater remediation alternative will remediate the contaminated groundwater using pump & treat, air-sparging, or recirculation wells (and, if applicable, natural attenuation for the appropriate portions of the plume), thereby reducing and eventually removing the future risks to human health which could result from ingestion and inhalation of the groundwater. This remedy would also reduce the potential risk to the environment. The contaminated soil will be treated utilizing solidification/ stabilization and aeration. Only those soils that remain RCRA hazardous would be taken off-site, and those soils that continue to leach above drinking water standards will be placed into a RCRA Subtitle D landfill on-site. However, if it is determined to be more cost-effective during RD/RA, a portion or all of the contaminated soils may be taken off-site. These soils may be treated by the off-site facility.

Compliance with ARARs: The selected remedy will meet ARARs, which are listed in Sections 9.1.2 and 9.2.2 of this ROD.

Cost effectiveness: Among the soil and groundwater alternatives that are protective of human health and the environment and comply with all ARARs, the selected alternatives are the most cost-effective choices because they use treatment technology to remediate the contamination in basically the shortest time frame, at a cost similar to the other treatment alternatives.

Utilization of Permanent solutions, and alternative treatment technologies or resource recovery technologies to the maximum extent practicable: The selected remedies represent the use of treatment for a permanent solution. Among the alternatives that are protective of human health and the environment and comply with all ARARs, EPA and the State of South Carolina have determined that the selected remedy achieves the best balance of trade-offs in terms of long-term effectiveness and permanence, reduction of toxicity/ mobility/volume, short-term effectiveness, implementability, and cost. The selected soil and groundwater actions are more readily implementable than the other treatment alternatives considered and the selected soil and groundwater remediation alternatives will fulfill the preference for treatment as a principal element.

TABLE 2
REMEDIAL GOALS (Rgs)

CONTAMINANTS OF CONCERN	GROUNDWATER (RGs) UG/L
Bis-2-ethylhexyl phthalate	6.0
1,2-Dichloroethane	5.0
1,2-Dichloroethene (Total)	70
Tetrachloroethene	5.0
Trichloroethene	5.0
Vinyl Chloride	2.0
Ethylbenzene	700
Toluene	1000
Xylenes (Total)	10,000
Lead	15*

CONTAMINANTS OF CONCERN	RGs for Protection of Groundwater. Soil concentrations below which leaching above MCLs is not expected to occur (mg/kg)	MCLs (ug/l)
Bis-2-ethylhexyl phthalate	Not detected in TCLP leachate, but detected in soil and groundwater samples. May be determined in RD/RA.	6.0
1,2-Dichloroethane Not	detected in TCLP leachate	5.0
1,2-Dichloroethene (Total)	1.5	70
Tetrachloroethene	0.1	5.0
Trichloroethene	0.09	5.0
Vinyl Chloride	0.74	2.0
Ethyl benzene	62	700
Toluene	136	1000
Xylenes (Total)	1400	10,000
Lead	May be determined in RD/RA	15*

*Action Level

TABLE 2 (con't)
REMEDIAL GOALS (RGs)

CONTAMINANTS OF CONCERN	RGs FOR SURFACE SOILS (mg/kg)
Lead - Industrial	1150
Arsenic	34
Beryllium	12
CPAH (BAP-TE)] (Polynuclear aromatic hydrocarbons)	5

ECOLOGICAL RGs BASED ON TOXICITY STUDIES

CONTAMINANTS OF CONCERN	mg/kg
Lead	700
Arsenic	15
Copper	150
Zinc	350

The RGs for the protection of groundwater for Ethyl benzene, Toluene, and Xylenes (Total), and Bis-2-ethylhexyl phthalate, may be reevaluated during RD/RA since the calculated levels exceed most of the levels detected in the soil samples, yet these contaminants were detected in the groundwater. Lead may have, an RG established for protection of groundwater, during RD/RA.

APPENDIX A
RESPONSIVENESS SUMMARY
SHURON SUPERFUND SITE

1. Overview

The U. S. Environmental Protection Agency (EPA) held a public comment period from December 5, 1997 to January 5, 1998, for interested parties to comment on the remedial investigation/ feasibility study (RI/FS) results and the Proposed Plan for the Shuron Superfund Site located in Barnwell, South Carolina. Upon receipt of a request, the comment period was extended an additional thirty (30) days. The comment period closed on February 4, 1998.

EPA held several public meetings and an availability session. The availability session was held prior to the start of the public comment period and occurred at 7:00 p.m. on November 22, 1997. The first public meeting was at 7:00 p.m. on December 9, 1998, at the Barnwell County Council Chambers in Barnwell, Soulth Carolina, to present the results of the RI/FS and the Baseline Risk Assessment, to present EPA's Proposed Plan, and to receive comments from the public. The second public meeting was held on January 22, 1998 at the same time and place and again presented the above information and solicited comments.

EPA proposed a soil and a groundwater remedy. The soil remedy consists of excavating all contaminated soils exceeding RGS, followed by treatment of the soils and wetlands restoration. These contaminated soils will be aerated and solidified/stabilized (S/S) to prevent the contaminants in the soil from leaching above drinking water standards. If, after aggressive treatment, the RCRA non-hazardous waste continues to leach above drinking water standards, it will be disposed of in an on-site RCRA Subtitle D landfill. Soils that are designated as RCRA hazardous waste, or if treated, remain RCRA hazardous, will be disposed of off-site at an acceptable hazardous waste facility. Soils not leaching above MCLs, would not need to be placed into a Subtitle D landfill, but if not, will be placed under an engineered cap to prevent direct contact exposure. If it is determined during RD/RA, that it would be more cost effective to take all or a portion of the soils that leach above MCLs off-site, then this alternative may be implemented versus on-site treatment and construction of an on-site Subtitle D landfill.

The groundwater remedy consists of groundwater treatment using either; pump & treat, air-sparging, recirculation wells or a combination, of all contaminated groundwater followed by discharge to Turkey Creek, POTW, or reinjection (for extracted groundwater). If it is shown during the evaluation period that natural attenuation is occurring, and would remediate the contaminated groundwater within a similar time frame, then this may be implemented for the appropriate portions of the plume.

The Responsiveness Summary provides a summary of citizens' comments and concerns identified and received during the public comment period, and EPA's response to those comments and concerns. These sections and attachments follow:

- Background of Community Involvement
- Summary of Comments Received During the Public Comment Period and EPA's Responses;
- Attachment A: Proposed Plan for Shuron Superfund Site;
- Attachment B: Public Notices of Public Comment Period & Extension of Public Comment Period;
- Attachment C: Written Public Comments Received During the Public Comment Period;
- Attachment D: Official Transcript of the Proposed Plan Public Meeting and the second public meeting.

2. Background of Community Involvement

EPA's community relations program for the Site began in February 1995, when EPA mailed out a fact sheet and conducted community interviews, in order to develop a community relations plan for the Site. At that time, residents living adjacent to the Site voiced concerns about loss of jobs and revenue, and that they wanted the building to be used to bring jobs to the area or reopen the old facility. The nearby residents commented on how they could walk to work in the past. Local officials were concerned over lack of tax revenue generated by the plant and the unpaid back taxes. Most residents and local officials were aware of the nearby municipal well and the local officials were aware that contaminants had not been detected above drinking water levels in the previous sampling events at that time. The residents EPA met with were informed of the results. Local officials were concerned over the time it would take to investigate and cleanup the site. One previous short term Shuron employee was concerned about asbestos that had been used during operations.

Throughout EPA's involvement, the community has been kept aware and informed of Site activities and findings. Local officials were briefed during the community interviews, and updated as needed. EPA has responded to inquiries from the community and other interested parties.

3. Summary of Comments Received During the Public Comment Period and Agency Responses

The Public Comment Period was opened on December 5, 1997, and ended on January 5, 1998. Upon request, a thirty (30) day extension was granted, which extended the comment period to February 4, 1998. Public notice announcements were published in local newspapers and copies of the announcements are included as Attachment B.

On December 9, 1997 EPA held a public meeting to present the Proposed Plan to the community and to receive comments. Another meeting was held January 22, 1998. All comments received at this public meetings and during the public comment period are summarized below.

Summary and Response to Local Community Concerns

The following issues and concerns were expressed at the Proposed Plan Public Meeting and the second public meeting, and during the public comment period.

COMMENT: The cleanup number for lead in the uplands soils, for a future industrial scenario, needs to be increased from 1150 ppm to 1500 ppm.

RESPONSE: The remedial level derived for the Shuron site is based on the assumption that a pregnant women will work on-site, for 5 days/week, for a duration as short as 90 days (not necessarily the whole pregnancy). While this scenario does not apply to the entire worker population (not all workers are women and not all women workers are pregnant), the assumptions are very reasonable for the woman who stays on the job for part or most of her pregnancy. EPA feels strongly that this subgroup of the worker population should be protected.

COMMENT: The cleanup numbers for the organic contaminants detected in the subsurface soils should not be determined at this point, but should be determined during Remedial Design/Remedial Action after additional samples are collected.

RESPONSE: During the RI, numerous (approximately 50) samples were collected and analyzed to determine the concentration of organic contaminants that could remain in the subsurface soils and still be protective of groundwater. The data was then plotted on graphs and calculations performed to determine what concentrations could remain while still protecting groundwater from further contamination. Most of the contanminants showed good correlation between the total concentration detected in the field and concentrations detected in the leachate. EPA does agree that the cleanup goals for lead, as well as ethyl benzene, toluene, and xylene (total), may need to be reevaluated during the RD/RA phase, because the numerical soil cleanup goals for the organics, exceed most of the contaminant levels detected in the soil samples, yet these same contaminants were detected in groundwater samples.

COMMENT: The area of wetlands stated in the Proposed Plan to be remediated, should not be remediated because the benefits of wetland remediation are outweighed by the harm that would be caused to the wetlands. Also, the cleanup number for lead is too low and should be increased from 700 ppm to 2000 ppm, and should only be applied on a site-wide average basis.

RESPONSE: The areas designated for excavation of contaminated sediments (i.e., vicinity of the North Drainage Ditch (NDD) and Southern wetlands) represent two of the most contaminated sediment areas. Removal of sediments in these source areas will decrease exposure of ecological receptors to toxic contaminant levels and decrease the potential for further contaminant migration through the wetlands and ditches. In addition, VOCs were also detected in the Southern Wetland sediments and soils, which would continue to leach to groundwater above drinking water standards. If these wetland areas were not remediated, they would continue to pose a risk to both human health and the environment. Therefore, EPA has required remediation of these areas. EPA also disagrees with the statement that the cleanup number for lead should be 2000 ppm and that the cleanup number should only be applied on a site-wide average basis. Through toxicity testing of sediment-dwelling invertebrates, 700 mg/kg lead was found to be the concentration at which 50% of the test population died. Higher concentrations resulted in greater mortality. Sediment dwelling invertebrates are important components of the wetland ecosystem. They are near the base of the food chain. Also, they are detrivores that feed upon organic matter, thus helping to recycle nutrients. Since the sediment-dwelling invertebrates in the wetlands are less mobile than higher animals (such as amphibians, mammals, and birds), the population as a whole, would have more exposure to the large areas of contaminated wetlands. Therefore, it would be inappropriate and not protective to apply the cleanup number on a site-wide average basis.

In addition, elevated concentrations of arsenic, copper, and zinc were also found in areas with elevated lead concentrations. Remediation of wetland areas based upon lead should also address areas containing toxic levels of these other metals.

The wetland area east of the facility also contains high contaminant concentrations, much of it in the NDD area. However, there are significant difficulties associated with excavating the contaminated sediments out in the middle of the eastern wetlands because of accessibility issues and because the area is significantly flooded for much of the year. Also, once the Northern Drainage Ditch area is excavated, the highest concentration of contaminated sediments will have been removed, thus eliminating the source of further contamination into the Eastern Wetlands. Also, the sediments in the middle of the eastern wetlands, do not have organic contamination leaching into the groundwater. Therefore, EPA is not requiring excavation of the contaminated sediments in the eastern wetlands.

COMMENT: All excavated soils (RCRA hazardous and RCRA non-hazardous) should be addressed by Soil Alternative 3 and not by the alternative stated in the Proposed Plan. [The alternative recommended by EPA is a combination of alternatives 3B and 4; S/S and if necessary, placement of soils in a Subtitle D landfill, if the contaminants continued to leach above MCLs. Alternative 3, on the other hand, involves placing those soils that are excavated, directly on the ground, three feet above the water table, with the metals contaminated soils as the initial lifts, followed by lifts of mixed organic and metals soils, with an flexible membrane liner (FML) cover layer. Some of the metals contaminated soils would not be excavated, but would be capped in place]. Also, the commentor stated that it should not be a requirement that the hazardous waste (as defined by RCRA) be disposed off-site. (RCRA is the primary federal law regulating the handling, transport and disposal of hazardous wastes.)

RESPONSE: Based on the information available to date, which indicates that (1) a large portion of the soils are saturated clays contaminated with both organic and inorganic (metals) contamination, and that (2) the water table is close to the land surface, EPA does not agree with the commentor that Alternative 3, alone, would be protective of human health and the environment. EPA does not accept, nor has it been demonstrated, that mixing the soils with quicklime, prior to placement of the soils directly onto the ground, will prevent contaminants from leaching to the groundwater above drinking water standards. Additionally, both EPA guidelines and environmental-industry standards of environmental remediation call for prevention of further leaching from source materials into groundwater; in other words, it is not acceptable to allow leaching of additional contamination to already-contaminated groundwater.

However, since some portion of the contaminated soils will be able to be treated with S/S so that they no longer leach contamination above drinking water standards (metals contaminated soils especially), EPA will not require that these soils be placed into an onsite RCRA Subtitle D landfill (as would normally be required), once it is demonstrated that the soils no longer leach above drinking water standards. Allowing the hazardous waste to remain onsite would not comply with RCRA ARARs, because under RCRA it is not considered protective to place hazardous waste directly on the ground or even in a RCRA Subtitle D landfill. As with any CERCLA remedy, the lead party or agency (in this case the PRP) is required to meet ARARs or obtain a waiver from EPA. In this case, EPA does not believe it would be prudent to allow a waiver of this ARAR to be less protective.

COMMENT: The proposed groundwater remedy should be modified to defer the decision on the need for a proactive groundwater treatment system until after the implementation of the source removal and completion of the groundwater evaluation period.

RESPONSE: Given the large amount of groundwater data collected during the RI/FS to date, which indicate that some areas of the site have extremely high levels of contaminants in the groundwater, an active remediation system of some kind will be required to address groundwater contamination, as opposed to passive remediation only (monitored natural attenuation). EPA has no basis to assume that the source removal component of the remedy will entirely remove and eliminate the high contaminant levels in the groundwater; furthermore, EPA experience on other sites' remedial actions arguies against such an assumption. For this reason, EPA does not agree that such a requirement is premature.

As the commentor notes, however, the source removal remedy component, which includes a temporary dewatering system operating for an additional four to six months beyond the source (soil) removal itself, should have a positive effect on the groundwater contamination. Therefore, EPA has included in its remedy the requirement that an evaluation period be conducted to determine the effectiveness of both the source removal and the effectiveness of monitored natural attenuation (NA) to address contaminants in the groundwater. If it is determined to be effective, then monitored NA could be applied to the appropriate portions of the plume.

CONMENT: Local officials were concerned with the future use of the property stating that they would like the future use to be recreational. They also were concerned with the building remaining on the site and wanted it to be torn down. They did not believe a new company would utilize the building in the future since it was not in the best of conditions. Also, the county has an industrial park nearby that they would prefer to steer new companies towards. They also felt it would be more appropriate to remove the contaminated soil off-site. Lastly, they wanted to know if the city and/or county would be liable for costs of the cleanup.

RESPONSE: EPA is required to make a reasonable future use evaluation for the site. Presently the site is not in use. There is a 185,000 square-foot building on the site, in fair condition, that could be used for future industrial purposes. Discussions with nearby residents frequently elicited questions such as "when is the plant going to reopen" or statements to the effect that "we would like a company to open a new facility so that nearby local residents could be employed there." In addition, significant cost may be incurred for removing the building. Local sentiment from the nearby residents, appears to favor the facility remaining available for potential industrial use. EPA does not have the authority to spend monies to tear down a building that does not pose an environmental risk or to make improvements to a property. Therefore, EPA believes that since the building remains on site, and because of local sentiment, a future industrial use is the most likely future use. However, EPA will continue to work closely with all stakeholders (i.e. local government, nearby residents, PRP, etc) to implement the remedy in such a way as to facilitate the pursuance of these expressed alternative uses of the property. EPA also has not precluded taking the contaminated soil off-site if it is determined during the RD/RA phase that it would be more cost-effective to do so. However, the Superfund program believes it is preferable to treat materials at the site versus taking it off-site to someone else's "backyard". There is also the possibility of future liability issues for the party that transports the waste to the off-site facilities. In response to the local officials concerns of their incurring costs, EPA stated at the public meeting that the law addressed owners, transporters, and operators that dealt with the generation and disposal of waste. Therefore, if the city or county has not been involved in this capacity, they would not be held liable.

Attachment A

Proposed Plan for Shuron Superfund Site

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

SUPERFUND PROPOSED PLAN FACT SHEET

SHURON SUPERFUND SITE <SRC IMG 98086C>

Barnwell, Barnwell County, South Carolina November 1997

This fact sheet is one in a series designed to inform residents and local officials of the ongoing cleanup efforts at the Site. A number of terms specific to the Superfund process (printed in italics print are defined in the glossary at the end of this publication.

INTRODUCTION

The United States Environmental Protection Agency (EPA) is proposing a cleanup plan, referred to as the preferred alternative, to address contaminated surface and subsurface soils, and sediments (all are combined together and referred to as soils), and groundwater at the Shuron Superfund Site (the Site) located in Barnwell, Barnwell County, South Carolina. This document is being issued by EPA, the lead agency for Site activitis, and the South Carolina Department of Health and Environmental Control(SCDHEC), the support agency. SCDHEC has reviewed EPA's preferred alternative and concurs with EPA's recommendation.

This Proposed Plan summarizes the cleanup methods/technologies evaluated in the Feasibility Study (FS). In accordance with Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986,(CERCLA, known as Superfund), EPA is publishing this Proposed Plan to provide an opportunity for public review and comment on all cleanup options (known as remedial alternatives) under consideration for the Site, as developed in the Feasibility Study, including EPA's preferred alternative. EPA is initiating a thirty (30) day public comment period from December 5, 1997 to January 5, 1998, to receive comments on this Proposed Plan and the RI/FS Reports. EPA, in consultation with SCDHEC, will select a remedy for the Site only after the public comment period has ended and all information submitted to EPA during that time has been reviewed and considered. As outlined in Section 117(a) of CERCLA, EPA encourages public participation by publishing Proposed Plans for addressing contamination at Superfund sites, and by providing an opportunity for the public to comment on the proposed remedial actions. As a result of such comments, EPA may modify or change its preferred alternative before issuing a Record of Decision for the Site. This process is explained in more detail in the Public Participation section of this document which begins on page 28. Contaminated surface soils, subsurface soils, and sediments that exceed Remedial Goals, will be excavated, except for sediments in the eastern wetlands (approximately 13 acres), followed by wetlands restoration. This will include the areas seen on Figure 3, though further delineation will be conducted during Remedial Design/Remedial Action (RD/RA), and will include; the four wastewater lagoons, two solid ponds, fill/debris area, Northern Drainage Ditch and the Southern wetlands.

PUBLIC MEETING
for the
SHURON SUPERFUND, SITE
Tuesday, December 9, 1997 - 7:00 P.M.
Barnwell County Council Chambers
Agricultural Building, 1603 Peckman

EPA's preferred alternative for the cleanup of these contaminated Site soils is a combination of Alternatives 3B and 4 (described below). This includes the following: Soils that cannot be treated to below RCRA Hazardous waste characteristic levels, would be disposed of off-site at an acceptable hazardous waste facility. Soils which are determined to be RCRA non-hazardous (before or after treatment) could remain on-site. Soils that remain on-site would be aggressively treated by solidification/stabilization (S/S) and aeration, to reduce the contaminant concentrations such that the contaminants should not leach out of the soils above MCLs (drinking water standards). The exact reagents to be used will be determined from laboratory and pilot scale treatability studies conducted during RD to determine the most effective reagent mixture. If, after aggressive treatment, the RCRA non-hazadous waste continues to leach above drinking water standards, (this is expected to be primarily VOC contaminated soils), the waste will be disposed of in an on-site RCRA Subtitle D landfill. The footprint of the landfill will be large enough to limit the height of the landfill as much as possible, but not to exceed ten feet high above the current land surface, such that it is mostly hidden behind the on-site building. Soils not leaching above MCLs, would not require placement in an on-site RCRA Subtitle D landfill, but would be placed under an engineered cap to prevent direct contact exposure. If it is determined during RD/RA, that it would be more cost effective to take soils that leach above MCLs off-site, then Alternative 7 (Off-Site Disposal) may be implemented versus a combination of Alternatives 3B and 4 (S/S and construction of an on-site RCRA Subtitle D landfill). During excavation and treatment, air emissions shall be monitored on-site and at the property boundary, and if necessary, odors/emissions shall be suppressed/collected.

The levels of contamination detected in the leachate from the RCRA TCLP test that would render a waste as RCRA Hazardous are as follows: For the metals only soil, lead - 5 ppm. For soils that have mixed metals and VOC contaminants, the total contaminant levels are: TCE - 6 ppm, PCE - 6 ppm, and the leachate concentration for lead is 0.37 ppm.

EPA's preferred alternative for contaminated groundwater is: temporary groundwater extraction for the dewatering of soil during soil excavation, and for an additional time of between four and six months after completion of the soil excavation, data collection/aquifer evaluation, followed by Active Groundwater Treatment or remaining (after dewatering) contaminated groundwater (pump and treat, recirculation wells, air-sparging or a combination). If applicable, Monitored Natural Attenuation may be applied to the appropriate portions of the contaminated groundwater plume. If this occurs, a ROD Amendment or ESD will be performed, if determined necessary by EPA or SCDHEC. This evaluation period shall be completed within 6 months of the shutdown of the temporary system. This will be followed by construction and operation or the groundwater system.

These alternatives (soil and groundwater) achieve the best balance of trade-offs among the criteria EPA uses to evaluate remedial alternatives. The selection of a cleanup plan, or "preferred alternative," represents a preliminary decision by EPA, subject to the public comment period. The preferred alternative for the soils and groundwater, as well as the others considered, are summarized in this fact sheet and presented more fully in the Feasibility Study (FS).

Scope and Role of this Action. The Site poses a potential future human health risk due to contaminants in the surface and subsurface soils, sediments, surface water, and the groundwater. The site poses an ecological risk due to contaminants in the sediments. EPA's plan for remediation of the Shuron Site will address all threats posed by the contaminated soils and groundwater.

This fact sheet summarizes information that is explained in greater detail in the Remedial Investigation (RI) Report, dated January 1997, which includes the Basefine Risk Assessment document, and the FS, dated April 1997. These documents and all other records utilized by EPA to make the proposal specified below are contained in the administrative record for this Site. EPA and SCDHEC encourage the public to review this information, especially during the public comment period, to better understand the Site, the Superfund process, and the intent of this Proposed Plan. The administrative record is available for public review during normal working hours, locally at the site information repository, which is the Barnwell Library or in the Record Center at EPA, Region IV's office in Atlanta, Georgia.

THIS PROPOSED PLAN:

1. Includes a brief history of the Site, the principle findings of the RI and a summary of the Baseline Risk Assessment;
2. Presents the cleanup alternatives considered by EPA for the Site;
3. Outlines the criteria used by EPA to recommend the alternatives for use at the Site;
4. Provides a summary of the analysis of alternatives;
5. Presents EPA's rationale for its preliminary selection of the preferred alternative; and
6. Explains the opportunities for the public to comment on the remedial alternatives, and hence the cleanup of the Shuron Superfund Site.

SITE BACKGROUND

Site Description. The Shuron Site is located at 100 Clinton Street in Barnwell, Barnwell County, South Carolina. Figure 1 presents a site location map. For this document, the entire 85-acre parcel will be referred to as the Site. There is one main building (about 185,000 square feet) which is situated on an approximate 34-acre parcel of land surrounded by a fence. Approximately one third of the 34-acre facility is paved or occupied by the main plant building. The reminder of the property consists of approximately 51 acres of mostly wetlands. The fence was partially extended to enclose a portion of the 51 acres in 1996. A removal action occurred inside the building under EPA's Emergency Response and Removal Branch in 1994, in which the drums left inside the building were removed.

The Shuron Site is bounded by residential properties immediately northwest and north-northeast, wetlands and then Turkey Creek to the east, wetlands and a railroad right-of-way to the south, and Clinton Street to the west. The nearest known water supply well is the continuously operating City of Barnwell, Well No. 10, located on the west side of Clinton Street approximately 375 feet west of the southwest corner of the Shuron plant building. The first screen interval is 180 feet below land surface.

<SRC IMG 98086F>

Site History. The former Shuron Site was constructed and placed into operation in 1958 as Shuron Continental Optical Company, a former division of Textron Inc. The facility manufactured single and multi-vision ocular lenses until early 1992 (though the company was sold by Textron in 1985). The manufacturing process involved grinding and shaping of lenses using primarily aluminum oxide and garnet, followed by polishing, predominantly with oxides of iron, cerium, and zirconium. Wastewater from the process was discharged to a series of four Wastewater Settling Lagoons immediately east of the building, the sediment from which was periodically transferred to two Solids Lagoons located immediately south of the Wastewater Settling Lagoons. Facility operations produced about 270,000 gallons per day (gpd) of wastewater containing the fine-grained grinding and polishing compounds, which contained lead, solvents, and waste oils. It is believed that a solvent (tetrachloroethene) was used to clean the lenses after the grinding and polishing process. EPA ranked the Site and included it on the National Priorities List Proposed Update in the Federal Register, Rule No. 20, Vol.61, No. 117, on June 17, 1996. The Site was added to the National Priorities List in the Federal Register, Rule No. 17, Vol. 61, No. 247 on December 23, 1996.

RESULTS OF THE REMEDIAL INVESTIGATION

The RI investigated the nature and extent of contamination on and near the Site, and defined the potential risks to human health and the environment posed by the Site. A total of approximately 104 surface soil samples (some or which are referred to as hydric soils) were collected and analyzed for various contaminants. Six or these samples were collected from background locations. Another 52 samples were analyzed for lead only. Twenty-six additional samples were analyzed for lead, chromium, and nickel, and another 16 samples were analyzed for arsenic, copper, lead, silver, and zinc. Ten samples were analyzed for the eight RCRA metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver). Seven of these samples were collected from background locations. A total of 103 subsurface soil samples were collected and analyzed for various parameters.

Groundwater samples from twenty-five wells were collected and analyzed for different compounds. Twenty-seven sediment samples were collected from 25 locations and analyzed for various contaminants. Surface water samples were collected from 34 locations and analyzed.

More detailed information can be found in the RI and FS reports, and in the Baseline Risk Assessment. The sample results or the various media are summarized in Table 1.

Surface Soil Contamination. Six volatile organic compounds (VOCs), semivolatile organics (including Polycyclic Aromatic Hydrocarbons (PAH's) and four metals were detected in the surface soils, which in some cases are referred to as sediments/hydric soils. Because of direct contact exposure to humans or the ecological system or because of the potential to leach to groundwater, these contaminants had clean-up numbers derived for them.

Subsurface Soil Contamination. Seven VOCs, Bis(2-ethylhexyl)phthalate, and four metals were detected in the subsurface soil samples. Most of these contaminants have the potential to leach to drinking water above MCLs (Maximum Contaminant Levels, drinking water standards) and therefore had groundwater protection clean-up numbers developed for them, or during the Remedial Design phase.

TABLE 1
SUMMARY OF RI RESULTS BY MEDIA

SUMMARY OF GROUDWATER RESULTS

CONTAMINANT	MAXIMUM CONCENTRATIONS (ug/L)	MCL
Vinyl chloride	3700J	2.0
1,2-dichloroethene	47,000	5.0
1,2-dichloroethane	2,600	70
Trichloroethene	61,000	5.0
Tetrachloroethene	52,000	5.0
Toluene	2,400	1000
Ethyl benzene	20,000	700
Xylenes (total)	93,000	10,000
Bis(2-ethylhexyl)phthalate	610	6.0
Lead	124	15*

SUMMARY OF SURFACE SOIL RESULTS

CONTAMINANTS	MAXIMUM CONCENTRATIONS (mg/kg)
1,2-dichloroethene	7.9J
Trichloroethene	0.85
Tetrachloroethene	4.2
Toluene	0.18 J
Ethyl benzene	0.038 J
Xylenes (total)	0.38 J
Bis(2-ethylhexyl)phthahte	230
Lead	14,600
Arsenic	136
Copper	741
Zinc	5,170

* An MCL has not been established for lead. However, at levels above the Action Level, EPA will require action to reduce lead content or reduce exposure to the affected water.

TABLE 1 (con't)
SUMMARY OF RI RESULTS BY MEDIA

SUMMARY OF SUBSURFACE SOIL RESULTS

CONTAMINANTS	MAXIMUM CONCENTRATION (mg/kg)	MAXIMUM DEPTH (though contamination may be deeper if deepest sample to date still had contamination) (feet)
Vinyl chloride	9.1	2
1,2-dichloroethene	460	7.5
Trichloroethene	1,100	5
Tetrachloroethene	2,500 J	7
Toluene	60	5
Ethyl benzene	1,400	10
Xylenes (total)	3,700	14
Bis(2-ethylhexyl)phthalate	110	10
Lead	17,400	7
Arsenic	117	7
Copper	400	7.5
Zinc	7,910	7

Maximum concentration does not necessarily correspond to maximum depth.
J - estimated

TABLE 1 (con't)
SUMMARY OF RI RESULTS BY MEDIA

SUMMARY OF SEDIMENT (Ditch/ creek/ wetlands) RESULTS

CONTAMINANT	MAXIMUM CONCENTRATIONS (mg/kg)
Vinyl chloride	0.2
1,2-dichloroethene	0.41
Toluene	2 J
Ethyl benzene	16
Xylenes (total)	68
Bis(2-ethylbexyl)phthalate	11
Lead	7,470
Arsenic	57.3
Copper	341 J
Zinc	2,080

SUMMARY OF SURFACE WATER RESULTS

CONTAMINANT	MAX1MUM CONCENTRATIONS (ug/L) (either lagoon (L) or wetlands (W))
Vinyl chloride	52 (L)
1,2-dichloroethene	1,400 (W)
Trichloroethene	10J (L)
Tetrachloroethene	15J (L)
Toluene	51 (W)
Ethyl benzene	17J (L)
Xylenes (total)	360 (L)
Bis(2-etbylhexyl)phthalate	95J (W)
Lead	343 (W)
Arsenic	5.6 (L)
Copper	116 (W)
Zinc	1,770 J (L)

Groundwater Contamenatian. Eight VOCs, Bis(2-ethylhexyl)phthalate, and lead were detected in the groundwater. Contaminant concentrations for all of the contaminants listed violate the Maximum Contaminant Levels (MCLs), which are often referred to as "drinking water standards." Therefore, Rgs for these contaminants were developed.

Surface Water Contamination. Seven VOCs, Bis(2-ethylhexyl)phthalate, and four metals were detected in the surface water. Surface water contamination will be addressed by the remediation of the other media.

Sediment Contamination. Five VOCs, Bis(2-ethylhexyl)phthalate, and four metals were detected in the sediment samples. Groundwater protection clean-up numbers were developed for some contaminants to prevent leaching of contaminants to groundwater above drinking water standards. In addition, clean-up numbers for the protection of the ecological system were developed. The contaminated sediments in the Eastern Wetlands (approximately 13 acres) currently pose a threat to the ecological system. However, because of the destruction that would occur in an attempt to remediate the sediments in the middle of the wetlands, and because of the implementability issues that would occur due to the area being flooded for much or the year, and because natural sediments will cover the contaminated sediments after the source removal has taken place, EPA believes it would be more protective to the ecological system to not remediate that portion of the wetlands.

Summary of Site Risks. The Baseline Risk Assessment describes the risks to human health and the environment in the absence of any further cleanup of Site contamination. The human health risk assessment considers both the current and future potential uses of the Site. For the current use scenario (off site resident trespassing onto the site) the health risks were all within EPA's acceptable risk range. For the future scenario, for a resident living on the site, the risks were unacceptable due to consumption of site groundwater as well as incidental ingestion of Site soil. Risks to a future onsite worker are also unacceptable due to consumption of groundwater as well as incidental contact with Site soil. There is also an unacceptable risk from exposure to surface water if exposure is also in conjunction with the consumption of contaminated groundwater. The ecological assessment indicated potential risks to invertebrates and amphibians in the wetlands from exposure to metals contamination. These include lead, zinc, arsenic, and copper.

The risks to human health are determined by assessing exposure "pathways", through which individuals are assumed to be exposed to the contaminants. The exposure doses to individual receptors are calculated by using reasonable upper bound assumptions for the frequency of exposure, how much of the site soil or water is contacted and/or ingested, as well as other relevant factors. The trespasser is assumed to contact the surface soil or sediment and the surface water (in the wetland area). For onsite residential exposure to groundwater (future scenario), the adult is assumed to drink two (2) liters (slightly more than two (2) quarts) of water per day, for thirty (30) years (assumed duration of living at the same location). The future worker is assumed to ingest and wash with the site groundwater each workday (total of 25O days per year for 25 years). Both the future resident and the future worker are assumed to get Site soil on the exposed skin and to incidentally ingest a nominal portion of that soil each day they are residing or working onsite.

For each pathway, different calculations are made to account for the two (2) general types of contaminants: carcinogens, which are suspected or known to cause cancer, and noncarcinogens, substances which can cause other adverse health effects.

For carcinogens, the result is expressed as the excess cancer risk posed by Site contaminants. CERCLA establishes a range of 1 x 10 -6 to 1 x 10 -4 as the acceptable range for lifetime excess carcinogenic risks. Excess risk in this range mearls that the exposed person has a probability of one in one million (1 x 10 -6) to one in 10,000 (1 x 10 -4) of developing cancer over a lifetime over and above the risk of cancer from other causes. The calculated cancer risks from all the Site contaminants are added together to determine the total site risk. Noncarcinogenic risk is assessed by using a reference dose for each chemical. The reference dose is the amount of the chemical to which EPA believes the human population can be exposed without risk of toxic effects. The Hazard Index (HI) is the ratio of the amount or the chemical exposure from the Site, divided by the reference dose. The HI value for the individual contaminants which cause toxic effects on the same body system are added together. EPA generally considers a total HI of no greater than 1.0 to be acceptable.

Carcinogenic risk and noncarcinogenic HI values were calculated for both the current land use scenario, with residents living near the Site, and the reasonably possible future land uses, which include commercial/industrial, residential, and a construction scenario (shorter duration of exposure). The Baseline Risk Assessment determined that the total cancer risk (using Reasonable Maximum Exposure) for the current scenario (nearby resident who trespasses onto the Site) was less than 1 x 10 -6; therefore, the Site does not pose an unacceptable cancer risk under the current exposure scenario. The total HI for the current scenario was less than 1.0, indicating that the Site does not pose an unacceptable non-carcinogenic risk under the current exposure scenario evaluated in the Baseline Risk Assessment. Therefore, in summary, the Site does not pose any unacceptable current risk to nearby residents.

The Baseline Risk Assessment determined that the total cancer risk for the future onsite worker ranged from 7 x 10 -5 to 3 x 10 2 , depending on if the deeper portion or the shallower portion of the aquifer (though it is all interconnected) is assumed to be the source of drinking water for the worker. This latter risk level exceeds EPA's acceptable risk range (1 x 10 -6 to 1 x 10 -4). The HI for the same receptor ranged from 0.3 to 200. In addition to these risk exceedances, MCLs were exceeded for organic contaminants and lead exceeded its action level in groundwater.

As would be expected, the risks estimated from the residential scenarios are also well above EPA's acceptable risk values since the exposure is greater for the onsite future resident than for a worker. The cancer risk for the future onsite resident ranged from 2 x 10 -4 to 2 x 10 -1. The toxic HI ranged from 2 to 2000 for this receptor. These risks all exceed EPA's acceptable risk range regardless of whether 2 potential future resident obtained drinking water from a well in the deeper or shallower portion of the groundwater. The majority of the onsite risks (both cancer and noncarcinogenic) for the future worker and residential scenarios are attributable to ingestion of volatile organic chemicals in the groundwater. In addition to these risk exceedances, MCLs were exceeded for organic contaminants and lead exceeded its action level in groundwater.

The construction worker scenario (assumed exposure to subsurface as well as surface soils, but not to site groundwater) resulted in an acceptable cancer risk (no greater than 1 x 10 -6) and HI (less than 1.0).

More detailed information concerning Site risks is presented in the Baseline Risk Assessment, which is a part of the Remedial Investigation Report, and is available at the public information repository.

REMEDIAL ACTION OBJECTIVES AND ALTERNATIVES

Remedial Action Obiectives. Based on the RI and the Baseline Risk Assessment, EPA has established the following remedial action objectives for the Shuron Superfund Site:

- Prevent ingestion/direct contact with surface soils, surface water, and sediments, having:

  S Carcinogen concentrations above levels that would exceed an acceptable cancer risk range of 10 -4 to 10 -6, and

  S Noncarcinogen concentrations above levels that would exceed an acceptable Hazard Index (HI) of 1.0.

- Prevent migration of contaminants from surface and subsurface soils, and sediments, that would pose a risk to human health due to the leaching of contaminants to groundwater in excess of Federal/State limits or health-based levels.

- Prevent concentrations of contaminants from exceeding the applicable Federal and South Carolina Ambient Water Quality Criteria for surface waters.

- Restore the groundwater system to potential productive use, by cleanup to the standards described above, and by minimizing the migration of the contaminants beyond the existing limits of the contaminant plume.

- Prevent direct contact with sediments or hydric soils that would result in an unacceptable risk to ecological receptors.

- Prevent ingestion of contaminated groundwater from the Site containing:

  S Carcinogen concentrations above Federal or State standards, and above levels that would exceed an acceptable cancer risk range of 10 -4 to 10 -6, and

  S Noncarcinogen concentrations above Federal or State standards, or in the absence of standards, above levels that would exceed an acceptable Hazard Index: (HI) or 1.0.

The Baseline Risk Assessment conducted by Textron's consultant, under EPA oversight, concluded that groundwater, surface soils, subsurface soils, surface water, and sediments at the Site are media of concern. Exposure to these media resulted in risk to human health (assuming an industrial future use, or a residential future use), or to the environment, that exceeds acceptable levels. As a result, Remediation Goals were developed for both future scenarios for groundwater, surface soils, subsurface soils (due to leaching contaminants to groundwater), and sediments in the BRA. Surface water contamination would be addressed by remediating the other media. Presently, the Site is not in use. There is a 185,000-square-foot building onsite, in fair condition, that could be used in the future for industrial purposes. Discussions with nearby residents frequently elicited questions such as "when is the plant going to reopen" or statements to the effect that "we would like a company to open a new facility so that nearby local residents could be employed there." In addition, significant cost may be incurred, for removing the building, if the property was to be converted for a residential use. Even though there are residents living nearby, local sentiment appears to favor the facility remaining available for potential industrial use. Based on this potential benefit to the community and to the local tax base, EPA is proposing to remediate the Site to industrial cleanup standards. This would mean that some contaminated soil above residential standards, but below industrial standards, would not be addressed. EPA is specifically requesting comments from the public on whether industrial or residential cleanup standards should be used.

Establishment of Remediation Goal. EPA has established specific remediation goals (RGs) (i.e. cleanup standards) for surface and subsurface soil, sediment, and groundwater contaminants. Such standards are derived from several federal environmental laws, including the Safe Drinking Water Act (for water systems and potable water sources such as groundwater) and the Clean Water Act (for surface waters). The State of South Carolina has similar statutes. Contaminants regulated under these statutes are present at this Site. In cases where there is no State or Federal standard, RGs can be developed based on the Baseline Risk Assessment for human health (risk assessment calculations) and the protection of the environment (such as using toxicological studies). An RG for lead, in surface soil, was developed based on EPA's IEUBK model, and for the other contaminants, in the Baseline Risk Assessment. Subsurface soil RGs were developed such that the contaminants would not leach to groundwater above drinking water standards. RGs for the wetland sediments were developed from toxicity testing conducted at the site for protection or the environment.

Table 2 summarizes the remediation goals for surface and subsurface soils, sediments, and groundwater at the Site. The only exception would be lead in the drainage ditch outside the fence, north of the wastewater lagoons. The RG would be 400 ppm to protect nearby residents. The areas potentially requiring remediation are depicted on Figures 2 and 3, groundwater and soil, respectively, though the exact areas will be determined during Remedial Design/Remedial Action after further sampling is conducted.

Development oF Remedial Alternatives. In the FS, remedial alternatives were developed and evaluated for soil (including surface and subsurface soils, and sediments) and groundwater contamination. Then, the alternatives were compared against one another in detail.

EVALUATION OF REMEDIAL ALTERNATIVE

In selecting its preferred alternative, EPA used the following criteria to evaluate the alternatives developed in the FS. Seven (7) of the criteria were used to evaluate all the alternatives, based on environmental protection, cost, and engineering feasibility issues. The preferred alternative is further evaluated based on the final two (2) criteria.

Threshold Criteria: The first two (2) statutory requirements must be met by the alternative:

1. Overall Protection of Human Health and the Environment
2. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

Primary Balancing Criteria: These five (5) considerations were used to develop the decision as to which alternative should be selected.

3. Long-Term Effectiveness and Permanence
4. Reduction of Toxicity, Mobility, and Volume through Treatment (TMV)
5. Short-Term Effectiveness
6. Implementability
7. Cost

Modifying Criteria: These two (2) considerations indicate the acceptability of the alternative to the public, and/or local or State officials.

8. State Acceptance
9. Community Acceptance

SUMMARY OF THE REMEDIAL ALTERNATIVES

Below is presented the various alternative for addressing soil and groundwater contamination. They are also summarized and compared against the seven criteria on Table 3.

Table 2
REMEDIAL GOALS (RGs)

CONTAMINANTS OF CONCERN	GROUNDWATER (RGs) UG/L
Bis-2-ethylhexyl phthalate	6.0
1,2-Dichloroethane	5.0
1,2-Dichloroethene (Total)	70
Tetrachloroethene	5.0
Trichloroethene	5.0
Vinyl Chloride	2.0
Ethyl benzene	700
Toluene	1000
Xylenes (Total)	10,000
Lead	15

CONTAMINANTS OF CONCERN	RGs for Protection of Groundwater. Soil concentrations below which leaching above MCLs is not expected to occur (mg/kg)	MCLs (ug/l)
Bis-2-ethylhexyl phthalate	Not detected in TCLP leachate, but detected in total results of soil samples	6.0
1,2-Dichloroethane	Not detected in TCLP leachate	5.0
1,2-Dichloroethene (Total)	1.5	70
Tetrachloroethene	0.1	5.0
Trichloroethene	0.09	5.0
Vinyl Cloride	0.74	2.0
Ethyl benzene	62	700
Toluene	136	1000
Xylenes (Total)	1400	10,000
Lead	Shall determined during RD/RA	15*

* An MCL has not been established for lead. However, at levels above the Action Level, EPA will require action to reduce lead content or reduce exposure to the affected water.

CONTAMINANTS OF CONCERN	RGs FOR SURFACE SOILS (mg/kg)
Lead - Industrial	1150
Arsenic	34
Beryllium	12
CPAH (BAP-TE) (Polycyclic Aromatic Hydrocarbons)	5

ECOLOGICAL RGs BASED ON TOXICITY STUDIES

CONTAMINANTS OF CONCERN	mg/kg
Lead	700
Arsenic	15
Copper	150
Zinc	350

The RGs for the protection of groundwater for Ethyl benzene, Toluene, and Xylenes (Total), may be reevaluated during RD/RA since the calculated levels exceed most of the levels detected in the soil samples, yet these contaminants were detected in the groundwater. Lead will have an RG established for protection of groundwater, during RD/RA.

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TABLE 3
GROUNDWATER ALTERNATIVES

7 of 9 Criteria	Alternative 1 No Action	Alternative 2 Limited Action	Alternative 3 Source Removel w/dewatering evaluation period, action ground water treatment, and Nat.Atten., if acclicable.	Alternative 4 Source Removal w/ dewatering, source area extraction wells or trenches	Alternative 5 Source removel w/ dewatering, property boundary extraction wells
Overall Protection	Would not be overall protective since no action is occurring, just groundwater monitoring.	Would not be overall protective since only a minimal amount of contaminated, gw is removed during source removel. No action after this, only institutional controls.	Would be overall protective, since the contaminated groundwater would be addressed.	May not be overall protective, since only the source area contaminated, gw would be addressed. The contaminated, gw that is past the source area would not be addressed (i.e. between source area and property boundaries).	Would be overall protective, since the contaminated, gw would be addressed. However, it may take longer than other alternative, since the source area contaminated, gw would have to migrate to the property boundary to be addressed.
Meet ARARs	Would not meet ARARS since no action is occurring.	Would not meet ARARs since most contamination is not addressed.	Would meet ARARs, since the contaminated groundwater would be addressed.	May not meet ARARs since only the source area contaminated, gw would be addressed, and not the contaminated, gw past the source area.	Would meet ARARs, since the contaminated, gw would be addressed.
Long-Term Protective and Permanent	Would not be long-term protective since no action is occurring.	Would not be long-term protective since most contamination is not addressed.	Would be long-term protective, since the contaminated groundwater would be addressed.	May not be long-term effective for reasons stated above.	Would be long-term protective since the contaminated, gw would be addressed.
Reduce Toxicity, Mobility & Volume (TMV) Through Treatment	Would not reduce toxicity, mobility or volume of contaminants.	Would not reduce toxicity, mobility or volume of contaminants, since most contamination is not addressed.	Would reduce the TMV, since the contaminated groundwater would be addressed.	Would reduce the TMV of some of the contaminated, gw through treatment, but not all contaminated, gw.	Would reduce the TMV, since the contaminated, gw would be addressed.
Short-Term Effectiveness	No short-term implementation risk since no action is occurring.	No risk since minimal action is occurring	Some risk during excavation, and during extraction of contaminated, gw.	Some risk during excavation, and during excavation of contaminated gw.	Some risk during excavation, and during extraction of contaminated gw.
Implementability	No implementation difficulties since there would be no action.	Minimal implementation difficulties since there would be minimal action.	Some w/extraction.	Some w/extraction.	Some w/extraction.
Cost(PW)	$1.35 million	$1.8 million	$3.8-4.7 million	$ 4.6 million	

TABLE 3 (con't)
SOIL ALTERNATIVES

7 of 9 Criteria	Alternative 1 No Action	Alternative 2 Limited Action	Alternative 3 Excavation and On-Site Capping with No Bottom Liner	Alternative 3A Excavation and On-Site Capping with Bottom Liner for RCRA Non-Hazardous Soil and Off- Site Disposal of RCRA Hazardous Soil
	water treatment, and Nat.Atten., if	extraction wells or		
Overall Protection	Would not be overall protective since no action is occurring,	Would not be overall protective since none of the contaminated soil is addressed, just a deed restriction informing future owners of the contamination. Also, contaminants would continue to leach to groudwater and there would be a continuous risk to the environment.	Uncertainly that this is overall protective since contaminated. could leach to gw above MCLs.	May be overall protective, but is some concern that the RCRA hazardous, waste may leach to gw above MCLs.
Meet ARARs	Would not meet ARARS since no action is occurring.	Would not meet ARARs since contamination is not addressed.	Uncertainty that this alternative, meets ARARs since contaminated, could leach to gw above MCLs.	May meet ARARs, but there is some concern that the RCRA hazardous, waste may leach to gw above MCLs.
Long-Term Protective and Permanent	Would not be long-term protective since no action is occurring.	Would not be long-term protective since contamination is not addressed.	Uncertainty that this alternative, is long-term protective and permanent, since contaminated, may leach into the gw above MCLs.	May be long-term protective, but there is some concern that the RCRA hazardous, waste may leach to gw above MCLs.
Reduce TMV Through Treatment	Would not reduce toxicity and mobility or volume.	Would not reduce TMV of contaminants.	Would not reduce TV of contaminated, but should reduce the mobility to some degree.	Would not reduce TV of contaminants,but should reduce the mobility to some degree.
Short-Term Effectiveness	No risk since no action is occurring.	No short-trem implementability risk since no action is occurring.	Some risk during excavation from lead dust and VOCs in the air.	Some risk during excavation.
Implemtability	No implementation difficulties since there would be no action.	No implementation difficulties since there would be no action.	Minimal.	Minimal.
Cost(PW)	$0	$120,000	$7.7 million	$9.0 million

TABLE 3 (con't)
SOIL ALTERNATIVES

7 of 9 Criteria	Alternative 3B No Action Excavation and On-Site Capping with Bottom Liner for RCRA Non-Hazardous Soil, Offsite RCRA Hazardous Soil.	Alternative 4 Stabilization/Solidification	Alternative 5 In-situ Thermal treatment w/ a) Containment or b) Stabilization/Solidfication	Alternative 6 Thermal Desorption with a) Containment or b) Stabilization/Solidfication	Alternative 7 Off-Site Disposal
Overall Protection	Should be overall protective, since all had waste would be removed from the site, and the rest land filled; if the landfill is maintained	Would be overall protective though there may be some diff. Stabilization/Solidfication VOC centime, soils such that they do not leach contam.into the gw above MCLs.	According to literature, it may be overall protect.	Would be overall protective since the organic soils are treated and the metal soils are treated or contained such that they should not leach to gw above MCLs.	Would be overall plot, since all contam. soils would be removed from the site.
Meet ARARs	Should meet ARARs, since all haz waste would be removed from the site, and the rest landfilled; if the landfill is maintained indefinitely.	Would meet ARARs though there may be some dificulty; Stabilization/ Solidification VOC contaminated soils such that they do not leach contamination into the groundwater above MCLs.	According to literature, it may meet ARARs.	Would meet ARARs since the organic soils are treated and the metal soils are treated or contained such that they should not leach to groundwater above MCLs.	Would meet ARARs since all contaminated soils would be removed from the site.
Long-Term Protective and Permanent	Should be long-term protective as described above.	Would be long-term protective though there may be some diff. Stabilization/Solidification VOC contaminated, soils so that they do not leach contaminated, into the groundwater above MCLs.	According to literature, it may be long-term protective.	Would be long-term protective since the organic soils are treated and the metal soils are treated or contained such that they should not leach to groundwater above MCLs.	Would be long-term protective and permanent, since all contaminated soils would be removed from the site.
Reduce TMV Through Treatment	Some if haz, waste disposed off-site is treated.	Would reduce toxicity and mobility but no volume	If effective, it would reduce the TMV of the inorganic contamination and possibly the inorganic (if Stabilization/Solidification used).	Would reduce TMV of organics, & T&M of inorganic soils if Stabilization/Solidification. If contained, will not reduce the TMV of metal contaminats.	Some if waste disposed off-site is treated.
Short-Term Effectiveness	Some risk during excavation, Applies to all alternatives, but Alternatives 1 and 2.	Some risk during excavation and Stabilization/Solidification activities.	Minimal risk for the in-situ thermal part, some risk if Stabilization/ Solidification utilized.	Some risk during excavation and thermal desorption (and Stabilization/Solidification if this option is chosen).	Some risk during excavation and minimal during transport.
Implemtability	Minimal.	Some difficulty during excavation and Stabilization/Solidification activities.	May be difficult to implement due to saturated clayey soils.	Some difficulty during excaation and greater difficulty w/thermal.	Some difficulty during excavation
Cost(PW)	$11.2 million	$10.6-20.3 million	$10-15 million	$19.3-27.0 million	$11.8 million

Alternatives for Remediation of Groundwater. Five (5) alternatives were developed to address groundwater contamination. The components of Alternatives 1& 2, institutional controls, and groundwater and surface water monitoring, are implied for all alternatives. A source removal as discussed in Soil Alternative 3B, is also included with Groundwater Alternatives 2 to 5. The costs for monitoring for all the alternatives is for a thirty (30) year period. For the alternatives which involve a treatment technology, the cost is for a ten (10) year operating period. For each alternative, remedial action objectives will be considered met when the concentrations listed in Table 2 are not exceeded in any monitoring wells.

Alternative 1 - No Action Under the no action alternative, the Site is left "as is" and no funds are expended for the control or cleanup of the contaminated groundwater (including no source removal).

If no action is taken, future risks to potential persons living on or working at the Site will remain. Because hazardous contaminants would remain, a five (5) year review would be required under CERCLA. Total Present Worth (PW) is $1.35 million.

Alternative 2 - Source Removal with Groundwater Extraction During Excavation Period. This alternative includes the use of a wellpoint system to dewater the soil/sediment source areas for excavation. The groundwater extraction proposed in this alternative would occur during the period of excavation only. Extracted groundwater would be treated through an above-ground portable treatment system possibly consisting or an air stripper, liquid and vapor phase carbon, and a frac tank. The treatment system effluent would be discharged to Turkey Creek, groundwater, or the local POTW.

The institutional controls to be used are deed restrictions and well permit restrictions. Deed restrictions limit future use of the aquifer for such purposes as potable and industrial water supplies, irrigation, and washing. Permit restrictions issued by the State of South Carolina would restrict all well drilling permits issued for new wells on properties that may draw water from the contaminated groundwater plume. These restrictions would be written into the property deeds to inform future property owners of the possibility or contaminated groundwater beneath their property. PW Cost: $1.8 million.

Alternative 3 - Source Removal with Temporary Groundwater Extraction for Dewatering, Data Collection/Aquifer Evaluation, Active Groundwater Treatment or remining contaminated groundwater, and if applicable, Monitored Natural Attenuation.

A temporary groundwater recovery and treatment system will be used for dewatering purposes during the source removal as described in Groundwater Alternative 2, and then will be operated for an additional four to six months after completion of the soil removal.

An evaluation period for gathering data to design a proactive groundwater treatment system (pump and treat, recirculation wells, air-sparging, or a combination) to achieve RGOs in the groundwater plume, will be conducted before, during, and after the source removal. If, during the evaluation period, monitored natural attenuation can be demonstrated to be as effective as active remediation, within a comparable time frame, then this approach may be applied to the appropriate portions of the contaminated groundwater plume. This will be followed by construction and operation of the groundwater system. PW Cost: $2.4 - $5.0 million.

Alternative 4 - Groundwater Extraction and Treatment in Source Area. A temporary groundwater recovery and treatment system will be used for dewatering purposes during the source removal as described in Groundwater Alternative 2. In addition, treatment of groundwater utilizing a pump and treat system would occur in both the Fill/Debris area, the Solids Lagoon area and downgradient of the Solids Lagoon area. The extraction system would create a zone of influence and prevent the further migration of COCs. This alternative would take longer than other alternatives or a combination, to reach the remediation goals because the part of the plume that would have migrated past the source area extraction wells would only be reduced by natural attenuation. PW Cost: $3.8 - 4.7 million.

Alternative 5 - Groundwater Extraction and Treatment Near Property Boundary. A temporary groundwater recovery and treatment system will be used for dewatering purposes during the source removal as described in Groundwater Alternative 2. To prevent further migration of COCs, this alternative includes the instaltation of an extraction well system near the property boundary. This alternative will take longer than other alternatives or a combination of alternatives, to reach the remediation goals because of the time necessary for the contaminant plume to reach the extraction wells. PW Cost: $4.6 million.

Alternatives for Remediation of Soil. Seven (7) alternatives were developed to address soil contamination. The components of Alternative 2, institutional controls and groundwater and surface water monitoring, are implied for all alternatives. A source removal as discussed in the Soil Alternative 3B are also included with Alternatives 3B to 7. The costs for monitoring for all the alternatives, is for a thirty (30) year period. For each alternative, remedial action objectives will be considered met when the concentrations listed in Table 2 are not exceeded. Alternatives 3 to 7 also include the restoration of all excavated wetlands.

Alternative 1 - No Action Under the no action alternative, the Site is left "as is" and no funds are expended for the control or cleanup of the contaminated surface and subsurface soils, sediments, and sludges (all referred to as soils). If no action is taken, future risks to potential persons living on or working at the Site will remain, Because hazardous contaminants would remain, a Five (5) year review would be required under CERCLA. PW Cost: $0.

Alternative 2 - Limited Action A fence, typically 6 or 8-foot high chain-link, possibly with barbed wire, would be constructed around the area within which surface soils exceed RGOs, with signs on the fence notifying the public. The institutional controls would include a deed restriction limiting use of portions of the property in which soils exceeding RGs have been left in place, and stating that contamination remains and its location. The deed restriction would limit the activities that could potentially be conducted in or around these areas. The deed restriction would serve as notification to potential purchasers or developers of the property that land use is restricted in these areas. PW Cost: $120,000.

Alternative 3 - Excavation and On-Site Capping with No Bottom Liner Contaminated soil with concentrations exceeding RGs in Table 2 would either be capped in place, for some of the metals only soil, with an engineered cap (the soils would be in or near the groundwater), or the soils would be excavated and placed under an engineered cap. This includes both RCRA hazardous and RCRA non-hazardous waste. The design and construction of the capped areas would include a low permeability FML cap. Contaminated soils which are excavated, would be placed at least three feet above the seasonably high water table in the areas set aside for construction of the cap(s). Clean fill will be added, if necessary to create this separation. Initial lifts will be or metal contaminated soils passing the RCRA TCLP test, and the upper lifts will consist of mixed VOCs and metals contaminated soils. Capped areas would be isolated by fencing.

Those soils to be excavated that are wet, would be transported to a construction pad with controlled drainage (collection and treatment) and mixed with drying agents such as quicklime to absorb excess moisture and improve their physical and load bearing characteristics. In addition, all VOC soils will be aggressively treated by aeration to release VOCs during the mixing process with the dewatering reagent, and from materials handling processes. During Remedial Design, laboratory treatability testing and field pilot studies will be conducted to gather volatilization data to predict emissions during full scale soil excavation and modification activities, and to determine the amount of VOCs remaining in the soils. Soil vapor extraction (SVE) laterals may be placed throughout the organic contaminated soils beneath the cap, unless limited volume and concentrations of VOCs remain or it is determined during remedial design that SVE would not be effective due to permeability issues. PW Cost: $7.7 million.

Alternative 3A - Excavation and On-Site Capping with Bottom Liner for all Contaminated Soils. All contaminated surface and subsurface soils and sediments, with concentrations exceeding RGs in Table 2, including RCRA hazardous and RCRA non-hazardous soil, would be excavated and moved to an engineered containment system. The design and construction of the containment areas would include components such as a low permeability FML cap, an underliner and a leachate collection system. Clean soil will be added to bring the bottom of the containment systems to at least three feet above the seasonably high water table. The initial soil lifts will be of metal contaminated soils, and the upper lifts will consist of mixed VOC and metals soils.

The excavated wet soils would be transported to a construction pad with controlled drainage (collection and treatment) and mixed with drying agents such as quicklime to absorb excess moisture and improve their physical and load bearing characteristics. In addition, all VOC soil will be aggressively treated by aeration to release VOCs during the mixing process with the dewatering reagent, and from materials handling processes. During Remedial Design, laboratory treatability testing and field pilot studies will be conducted to gather volatilization data to predict emissions during full scale soil excavation and modification activities, and to determine the amount of VOCs remaining in the soils. Soil vapor extraction (SVE) laterals may be placed throughout the organic contaminated soils beneath the cap, unless limited volume and concentrations of VOCs remain or it is determined during remedial design that SVE would not be effective due to permeability issues. PW Cost: $9.0 million.

Alternative 3B - Excavation and On-Site Capping with Bottom Liner for RCRA Non-Hazardous Soil and Off-Site Disposal of RCRA Hazardous Soil. All contaminated surface soils, subsurface soils, and sediments that exceed Remedial Goals in Table 2, will be excavated. Soils that remain designated as RCRA hazardous waste, would be disposed of off-site at an acceptable hazardous waste facility. Soils which would be designated as RCRA non-hazardous would remain on-site. The RCRA non-hazardous waste which leaches above drinking water standards, would be disposed in an on-site RCRA Subtitle D landfill. Soils not leaching above MCLs, would not be placed into a Subtitle D landfill, but would be placed under an engineered cap, to prevent direct contact exposure. The design and construction of the Subtitle D landfill would include components such as a low permeability FML cap, an underliner and a leachate collection system. Clean soil will be added to bring the bottom of the landfill to at least three feet above the seasonably high water table. The initial soil lifts will be of metal contaminated soils, and the upper lifts will be mixed VOC and metals soils.

The excavated wet soils would be transported to a construction pad with controlled drainage (collection and treatment) and mixed with drying agents such as quicklime to absorb excess moisture and improve their physical and load bearing characteristics. In addition, all VOC soil will be aggressively treated br aeration to release VOCs during the mixing process with the dewatering reagent, as well as from materials handling processes. During Remedial Design, laboratory treatability testing and field pilot studies will be conducted to gather volatilization data to predict emissions during full scale soil excavation and modification activities, and to determine the amount of VOCs remaining in the soils. Soil vapor extraction (SVE) laterals may be placed throughout the organic contaminated soils beneath the cap, unless limited volume and concentrations of VOCs remain or it is determined during remedial design that SVE would not be effective due to permeability issues. PW Cost: $11.2 million.

Alternative 4 - Stabilization/Solidification All contaminated surface soils, subsurface soils, and sediments that exceed Remedial (Goals in Table 2, will be excavated. These soils would be treated using stabilization/solidification (Stabilization//Solidification). The soils would be excavated and treated and consolidated on site in upland areas. Treatment effectiveness may be evaluated against RCRA TCLP test results as well as TCLP using site background groundwater, and possibly other tests (possibly the ASTM water leach test or EPA 1312 test). The results will be compared to drinking water standards. Treated areas would be isolated by fencing (with signs) and would be covered with a cap.

The term stabilization refers to the technology where a chemical agent, typically self-cementing (pozzolanic), is added to a waste to reduce the hazard potential or that waste; solidification refers to processes that convert liquid and semi-solid wastes to a solid form (monolith), typically binding contaminants mechanically in the solid matrix and significantly reducing the permeability.

Given the present knowledge of the soil characteristics, type and depth of contamination, ex situ Stabilization//Solidification, is probably the most appropriate method for treating contaminated soils on the Shuron Site. In addition, the soils will be aggressively treated by aeration to release the VOCs during the mixing of contaminated soils with the reagent, as well as from materials handling processes. During Remedial Design, laboratory treatability testing and field pilot studies will be conducted to: determine the most effective reagent mixture to prevent leaching of contaminants to groundwater above MCLs, to gather volatilization data to predict emissions during full scale soil excavation and modification activities, and to determine the amount, if any, of VOCs remaining in the soils.

On a CERCLA site, treatment of RCRA materials in a vessel may potentially trigger LDRs, if levels after treatment still exceeded RCRA characteristic levels. Stabilization/Solidification may include use of a vessel, therefore, LDRs may need to be met which include use of uniform treatment standard (UTS) technologies for pretreatment, and the underlying hazardous constituent levels for various contaminants (such as lead). PW Cost: $10.6 - 20.3 million.

Alternative 5 - In Situ Treatment Followed by A) Containment: or B) Stabilization/Solidification All contaminated surface soils, subsurface soils, and sediments that exceed Remedial Goals (RGs, Table 2), will be excavated. The soils would be initially treated in situ using thermal treatment technology to reduce concentrations to below RGs as described on Table 2. Inorganic contaminated soils would require Stabilization/Solidification as described for Alternative 4 and/or containment, as described for alternative 3B. Treated areas would be isolated by fencing and would be covered with a cap.

Potential process options for thermally treating soils include steam injection, hot air flushing, and six phase soil heating (SPSH). According to literature, SPSH has better performance data for treating fine-textured material both in the vadose zone and below the groundwater table. Therefore this will be the only option discussed. Six-phase soil heating (SPSH) is a technique that uses common low-frequency electricity to heat soils by converting standard three-phase power to six-phase power. Electrodes are inserted into the ground in circular arrays. Each electrode is connected to a separate transformer with a separate current phase. A seventh, neutral electrode is located at the center of the array and doubles as a soil vent. As electricity is applied, the soil heats, volatilizing organic compounds which are removed through the central soil vent. Pore water in the soil is the principle conductor of electricity. This technology is a variation of radio frequency heating, using one-fifth to one-tenth the power to net similar results. SPSH has been demonstrated on tight clayey soils for the removal of chlorinated compounds. Removal efficiencies for TCE and PCE exceeded 99% using target soil temperatures of 1005C. PW Cost: $10.0 - 15.3 million.

Alternative 6 - Low Temperature Thermal Desorption Followed by A) Containment: or B) Stabalization/Solidification All contaminated surface soils, subsurface soils, and sediments that exceed Remedial Goals (RGs, Table 2), will be excavated. The organic soils would be initially treated ex-situ using low temperature thermal desorption followed by Stabilization/Solidification or Containment (3B). Thermal desorption processes are designed to remove the volatile and some, semi-volatile organic compounds from soil. PW Cost: $22 - 27 million.

Alternative 7 - Excavation and Off-Site Disposal All contaminated surface soils, subsurface soils, and sediments that exceed Remedial Goals (RGs, Table 2), would be excavated and disposed off-site at an appropriate hazardous waste facility. Facilities may solidify the soils prior to disposal. PW Cost: $11.8 million.

EPA'S PREFERRED ALTERNATIVE

After conducting a detailed analysis of all of the alternatives, EPA has a preference for the following alternatives for soil and groundwater remediation or the Shuron Superfund Site:

> Combination of Soil Alternatives 3B and 4: All soils exceeding RGs will be excavated and dewatered. After this, whatever soils are determined to be RCRA hazardous waste, shall be disposed off-site, unless through aggressive treatment (Stabilization/Solidification and aeration), the soils are determined to no longer be RCRA hazardous. All soils that are designated as RCRA non-hazardous, may remain on-site. These soils that remain on-site will be aggressively treated by Stabilization/Solidification and aeration to reduce the contaminant concentrations, such that the contaminants do not leach out of the soils above MCLs. The exact reagents to be used will be determined from laboratory and pilot scale treatability studies conducted during RD to determine the most effective reagent mixture. If, after aggressive treatment, the RCRA non-hazardous waste continues to leach above MCLs, (this is expected to be primarily VOC contaminated soils), the waste will be disposed of in an on-site RCRA Subtitle D landfill. Soils not leaching above MCLs, would not require placement in an on-site RCRA Subtitle D landfill, but would be placed under an engineered cap to prevent direct contact exposure. If it is determined during RD/RA, that it would be more cost effective to take soils that leach above MCLs off-site, then Alternative 7 (Off-Site Disposal) may be implemented versus a combination of Alternatives 3B and 4. After excavation of the wetlands, the wetlands will be restored.

Total PW Cost: $11 - 15 million

Groundwater Alternative 3: Source Removal with Temporary Groundwater Extraction for Dewatering, Data Collection/Aquifer Evaluation, Active Groundwater Treatment of contaminated groundwater, and if applicable, Monitored Natural Attenuation.

Total PW Cost: $2.4 - 5.0 million

RATIONALE FOR THE PREFERRED ALTERNATIVE

The fourteen (14) alternatives for remediation were evaluated based upon the nine (9) criteria set forth in 40 C.F.R. º 300.430(e)(9) of the NCP. In the sections which follow, brief summaries of how the alternatives were judged against these nine (9) criteria are presented.

SOIL ALTERNATIVES

Threshold Criteria

Soil Alternatives 1 (No Action) and 2 (Institutional Controls/Monitoring), do not meet the threshold criteria or protecting human health and the environment and meeting ARARs, since no remedial action is taken. There is high uncertainty that Soil Alternative 3 (Capping with no bottom liner) will be overall protective or human health and the environment and will meet ARARs, because of the potential to leach contaminants to the groundwater above MCLs. This is a significant concern since the groundwater at the Site is very shallow, about 3 feet below land surface. Soil Alternative 3A may meet the threshold criteria, but there is some uncertainty as to whether hazardous waste, as defined by RCRA, will leach from the landfill. RCRA regulations do not allow a Subtitle D landfill to accept waste that leaches above RCRA characteristic levels, and this alternative does not even include all the requirements of a Subtitle D landfill. Alternative 3B (Excavation and On-Site Capping with Bottom Liner for RCRA Non-Hazardous Soil and Off-Site Disposal of RCRA Hazardous Soils) should be overall protective, if the landfill is maintained indefinitely. Alternative 5 may meet the threshold criteria, according to literature, however, there is still some concern of its protectiveness since In-Situ Thermal Treatment is a relatively new technology, which may be hindered by the reduced air flow through the soil.

The other three (3) alternatives, Alternative 4 (Stabilization/Solidification (In Situ and/or Ex Situ), Alternative 6 (Low Temperature Thermal Desorption Followed by A) Containment; or B) Stabilization/Solidification, and Alternative 7 (Off-Site Disposal) will meet the two (2) threshold criteria of being protective of human health and the environment and meeting ARARs. A combination of Alternative 4 with Alternative 3B, would be as overall protective as the other alternatives alone.

Using this combination of alternatives, the soils would be aggressively treated with aeration and Stabilization/Solidification to treat the metals and most of the VOC contaminants, so that they no longer leach above MCLs. Then alternative 3B could be implemented such that those soils that continue to leach above RCRA hazardous levels, would be disposed of off-site. Those that are between RCRA hazardous and MCLs, VOCs primarily, could be placed into a Subtitle D landfill. Thus this combination would be overall protective and meet ARARs, since the high level contamination would be removed from the Site, and any contaminants that may still leach above MCLs after aggressive treatment, but at considerably lower levels than before treatment, would be prevented from leaching into the groundwater utilizing engineering controls.

Primary Balancing Criteria

Soil Alternatives 1 (No Action) and 2 (Institutional Controls/Monitoring), will not be long-term effective and permanent for reasons stated above. Again, there is high uncertainty that Soil Alternative 3 (Capping with no bottom lineir) and some uncertainty that Soil Alternative 3A will be long-term effective for the same reasons stated above since the groundwater is very shallow. Alternative 3B (Excavation and On-Site Capping with Bottom Liner for RCRA Non-Hazardous Soil and Off-Site Disposal of RCRA Hazardous Soils) would probably be overall protective, under the conditions described above. Alternatives 1 to 3B do not meet the statutory preference for treatment. Alternative 5 may be effective, but this is based on literature. It would also meet the preference for treatment, if effective.

Alternative 4 (Stabilization/Solidification) would be long-term effective and would meet the statutory preference for treatment. Alternative 7 (Off-site disposal) would be long-term effective and permanent since the contaminated soil would be removed from the site. Also, the off-site disposal facility would be secured since it would have personnel onsite to ensure no trespassers, would be regulated, and already conducts monitoring. It also may partially satisfy the preference for treatment if the off-site facility solidifies the soil prior to placement into the landfill. Alternative 6 (Thermal Desorption with Stabilization/Solidification (for the inorganic soils) would also be long-term effective and permanent and would most satisfy the statutory preference for treatment, since both the organic and metals contaminants would be treated (if metals soils were Stabilization/Solidification). Thermal treatment with on-site containment of the metals soils, may be less long-term permanent, than Stabilization/ Solidification of the metals soil, and would not satisfy the preference for treatment as well as treating both the metals and VOC soils. As described above, a combinations of Alternatives 4 and 3B, would be as long-term effective and permanent as the other alternatives alone, and satisfy the statutory preference for treatment.

The greatest implementability difficulties and highest short term risk would be Alternative 6, Thermal Desorption due to the saturated clayey soils. Alternative 4 (Stabilization/ Solidification) may have some implementability difficulties for the same reasons, and also may have a slightly higher short term risk than Alternatives 3 to 3B (Containment), as well as Alternative 7 (Off-site disposal). Alternative 5 (In-situ thermal treatment) may not pose as much of a short term risk as Alternatives 4 (Stabilization/Solidification) and 6 (Ex-situ thermal) but more than 3 to 3B (Containment) and 7 (Off-site disposal). There would, however, be implementability difficulties due to the saturated clayey soils for Alternative 5.

The least expensive alternatives (besides 1 and 2) are 3 ($7.7 million) and 3A ($9.0 million). The costs of Alternatives 3B, 4, S, and 7 are similar, approximately $11 to 12 million. The cost of Alternative 4 could increase above this amount if special additives are needed to treat the VOCs in the soil (up to approximately $20 million). Alternative 6 costs significantly more than all the other alternatives, up to approximately $27 million. A combination of Alternatives 3B and 4 would probably be the most cost effective, protective alternative, since the soils are aggressively treated with Stabilization/Solidification, though not necessarily with high cost additives such as organoclays or proprietary mixtures. Then those soils that continue to leach above MCLs, could be placed into a RCRA Subtitle D landfill to prevent leaching of contaminants to groundwater.

Therefore, based on the seven criteria, EPA's preferred alternative is a combination of Alternatives 3B and 4 (for RCRA non-hazardous soils - Excavation, Stabilization/Solidification, and Subtitle D landfill and, for RCRA hazardous soils - Off-Site Disposal). Soils not leaching above MCLs, would not be placed into a Subtitle D landfill, but would be placed under an engineered cap that will prevent direct contact exposure. If it is determined to be mom cost effective, the non-hazardous soils may also be disposed off-site. This combination of alternatives would be overall protective and meet ARARs since the highest contaminated soil would be removed from the site, and the remainder would be aggressively treated with stabilization/solidification and aeration to prevent leaching of contaminants above MCLs. A Subtitle D landfill will be constructed for soils that continue to leach contaminants above drinking water standards, only after aggressive treatment. This combination provides a more cost effective and protective alternative than each of the alternatives alone. It would also satisfy the preference for treatment for most of the soils.

GROUNDWATER ALTERNATIVES

Threshold Criteria

Groundwater Alternatives 1 (No Action) and 2 (Institutional Controls/Monitoring) do not meet the threshold criteria of protecting human health and the environment and meeting ARARs. The other three (3) alternatives, Alternative 3 (Source Removal with Temporary Groundwater Extraction for Dewatering, Data Collection/Aquifer Evaluation, Active Groundwater Treatment of remaining contaminated groundwater, and if applicable, Monitored Natural Attenuation), Alternative 4 (Groundwater Extraction and Treatment at the source area), and Alternative 5 (Groundwater Extraction and Treatment at the property boundary) will meet the two (2) threshold criteria of being protective of human health and the environment and meeting ARARs.

Balancing Criteria

All alternatives should meet the Superfund Amendments and Reauthorization Act of 1986 (SARA) requirements favoring active remediation of contaminated groundwater, which Alternatives 1 and 2 do not. Alternatives 3, 4, & 5 meet the five (5) balancing criteria. Alternative 3 allows an evaluation period for gathering data to design the most effective proactive treatment groundwater system (pump and treat, recirculation wells, air-sparging or a combination) to achieve RGs in the entire groundwater plume. If, during the evaluation period, monitored natural attenuation can be demonstrated to be as effective as active remediation, within a, comparable time frame, then this approach may be applied to the appropriate portions of the contaminated groundwater plume. Alternative 4, will probably take longer to clean-up the groundwater and would only apply to a portion of the plume because only the source area would be remediated. The portions of the plume not affected by the extraction system would not be treated. Alternative 5 would take longer than alternative 3 because of the time necessary for the entire contaminant plume to reach the extraction wells along the southern property boundary, near the railroad bed.

In view or these comparisons, EPA believes that a combination of Soil Alternatives 3B and 4, and Groundwater Alternative 3, are the best alternatives for remediation of the soils and groundwater at the Site. Employing these Alternatives would protect human health and the environment and result in meeting ARARs. The Alternatives are easily implementable, will be effective in the long term, and reduce contaminant toxicity and mobility by treating the soil and the groundwater.

STATE ACCEPTANCE:

The SCDHEC concurs with the selected groundwater remediation of Alternative 3. If monitored natural attenuation is selected for a portion of the plume, a ROD Amendment or ESD will be performed, if determined necessary by either EPA or SCDHEC.

SCDHEC concurs with the selected remediation option for soils of a combination of Alternatives 3B and 4 (described above). SCDHEC also concurs that if it is determined during RD/RA, that it would be more cost effective to take soils that leach above MCLs off-site, then Alternative 7 (Off-Site Disposal) may be implemented versus a combination of Alternatives 3B and 4 (Stabilization/Solidification and construction of an on-site RCRA Subtitle D landfill). However, acknowledging the current conflicting views on the appropriate future use of the site, SCDHEC does not concur with the selected remedial goals for soils. Therefore, SCDHEC will seek input from the community during the Proposed Plan public meeting and comment period on the appropriate future use or the Site, as described above.

PUBLIC PARTICIPATION

EPA will hold a Public Meeting on Tuesday, December 9, 1997, to discuss the Preferred Alternative and the other alternatives evaluated in the FS. Officials from EPA and SCDHEC will present a summary of the RI/FS, the remedial alternatives, and how the preferred alternative was selected. The public is encouraged to attend this meeting.

EPA is also conducting a thirty (30) day public comment period, from Friday, December 5, 1997 to Monday January 5, 1998, in order to receive public input and comments on the preferred alternative for cleanup of the Site. Comments on the preferred alternative, the other alternatives, or other issues related to Site cleanup, are welcomed and are an important part of the decision-making process. Please send all comments to:

Ms. Sheri Panabaker
Remedial Project Manager
U.S. Environmental Protection Agency
61 Forsyth St, SW, WMD-NSMB-SC
Atlanta, Georgia 30303
404-562-8810, or 1-800-435-9233

EPA will review and consider all comments received during the comment period and the public meeting berore reaching a final decision on the most appropriate remedial alternative for Site cleanup (the "remedy"). EPA's final decision will be issued in a Record or Decision, a legal document which formally sets forth the remedy. A Responsiveness Summary, which contains all of the public comments received and EPA's responses to them, is part of the Record of Decision (ROD).

EPA representatives are available to provide briefings to residents living near the site, local officials and others prior to the proposed plan public meeting. To request a briefing, or if you would like more information on community relations in the Superfund process or at this Site, please contact:

Ms. Cynthia Peurifoy
Community Relations Coordinator
U.S. Environmental Protection Agency
61 Forsyth St, SW, WMD-NSMB-SC
Atlanta, Georgia 30303
(404)562-8798, or 1-800-435-9233

Attachment B

Public Notices of Public Comment Period and Extension
of Public Comment Period

<IMG SRC 98086I>
<IMG SRC 98086J>
<IMG SRC 98986K>
<IMG SRC 98086L>
<IMG SRC 98086M>

U.S. ENVIRONMENTAL PROTECTION AGENCY
EXTENDS THE PUBLIC COMMENT PERIOD ON THE
PROPOSED CLEANUP PLAN FOR THE SHURON SITE,
BARNWELL, BARNWELL COUNTY, SOUTH CAROLINA

The U.S. Environmental Protection Agency is extending the public comment period on the Proposed Plan for the cleanup of the Shuron Superfund Site. The comment period has been extended and will end on Wednesday, February 4, 1998. This extension was announced at the public meeting conducted on December 9, 1997. EPA will also conduct another public meeting to present the alternatives listed below, and to receive public comments. EPA encourages nearby residents, local officials and other interested parties to attend this meeting and provide comments on the preferred alternatives, as well as all alternatives evaluated in the FS.

PUBLIC MEETING:
THURSDAY, JANUARY 22, 1998
7:00 P.M.
BARNWELL COUNTY COUNCIL CHAMBERS
BARNWELL COUNTY AGRICULTURAL BUILDING
1603 Peckman, Barnwell, SC

Fourteen alternatives were considered in proposing this action. The figures in parentheses are the estimated present worth costs for each alternative. The following alternatives were considered:

Alternatives for Groundwater Remediation:

Alternative 1:	No Action ($1.3 million)
Alternative 2:	Source Removal and Groundwater Extraction During the Excavation Period ($1.8 million)
Alternative 3:	Source Removal with Temporary Groundwater Extraction for Dewatering, Data Collection/Aquifer Evaluation, Active Groundwater Treatment of Remaining Contaminated Groundwater, and if applicable, Monitored Natural Attenuation ($2.4 - $5.0 million)
Alternative 4:	Groundwater Extraction & Treatment in Source Area ($3.8 - $4.7 million)
Alternative 5:	Groundwater Extraction & Treatment Near Property Boundary ($4.6 Million)

Alternatives for Remediation of Soil:

Alternative 1:	No Action ($0)
Alternative 2:	Limited Action - Institutional Controls ($120,000)
Alternative 3:	Excavation and On-Site Capping with No Bottom Liner ($7.7 Million)
Alternative 3A:	Excavation and On-Site Capping for All Contaminated Soils ($9.0 Million)

Alternative 3B:	Excavation and On-Site Capping with Bottom Liner for RCRA Non-Hazardous Soil and Off-Site Disposal of RCRA Hazardous Soil ($11.2 Million)
Alternative 4:	Stabilization/Solidification (S/S)($10.6 - $20.3 Million)
Alternative 5:	In Situ (In Place) Thermal Treatment Followed by Containment or Stabilization/ Solidification ($10.0 to $15.3 Million)
Alternative 6:	Low Temperature Thermal Desorption Followed by Containment or Stabillization/Solidification ($22 - 27 Million)
Alternative 7:	Excavation and Off-Site Disposal ($11.8 Million)

After conducting a detailed analysis of all of the alternatives, EPA has a preference for the following alternatives for soil and groundwater remediation of the Shuron Superfund Site:

Combination of Soil Alternatives 3Bb and 4: All soils exceeding Remediation Goals will be excavated and dewatered. After this, whatever soils are determined to be RCRA hazardous waste, shall be disposed off-site, unless through aggressive treatment (S/S and aeration), the soils are determined to no longer be RCRA hazardous. All soils that are designated as RCRA non-hazardous, may remain on-site. These soils that remain on-site will be aggressively treated by S/S and aeration to reduce the contaminant concentrations, such that the contaminants do not leach out of the soils above MCLs (drinking water standards). The exact reagents to be used will be determined from laboratory and pilot scale treatability studies conducted during the Remedial Design phase to determine the most effective reagent mixture. If, after aggressive treatment, the RCRA non-hazardous waste continues to leach above MCLs, (this is expected to be primarily VOC contaminated soils), the waste will be disposed of in an on-site RCRA Subtitle D landfill. Soils not leaching above MCLs, would not require placement in an on-site RCRA Subtitle D landfill, but would be placed under an engineered cap to prevent direct contact exposure. If it is determined during RD/RA, that it would be more cost effective to take soils that leach above MCLs off-site, then Alternative 7 (Off-Site Disposal) may be implemented versus a combination of Alternatives 3B and 4. After excavation of the wetlands, the wetlands will be restored.

Total PW Cost: $11- 15 million

Groundwater Alternative 3: Source Removal with Temporary Groundwater Extraction for Dewatering, Data Collection/Aquifer Evaluation, Active Groundwater Treatment of contaminated groundwater, and if applicable, Monitored Natural Attenuation.

Total PW Cost: $2.4 - $5.0 million

As stated earlier the extended public comment period will end on Wednesday, February 4, 1998. Comments on the preferred alternative, the other alternatives, or other issues related to Site cleanup, are welcomed and are an important part of the decision-making process. Please send all comments to:

Ms. Sheri Panabaker
Remedial Project Manager
U.S. Environmental Protection Agency
61 Forsyth St, SW, WMD-NSMB-SC
Atlanta, Georgia 30303
404-562-8810, or 1-800-435-9233

EPA will review and consider all comments received during the comment period and the public meeting before reaching a final decision on the most appropriate remedial alternative for Site cleanup (the "remedy"). For more information on community relations in the Superfund process or at this Site, please contact Cynthia Peurifoy, Community Relations Coordinator, at the above address or by phone at (404) 562-8798, or 1-800-435-9233. Ms. Peurifoy can also arrange briefings for local officials and residents near the site, as well as provide copies of the Proposed Plan Fact Sheet, or add individuals to EPA's mailing list for the site.

Copies or the proposed plan, as well as the Administrative Record for the site, are available for review at the site information repository, which is in the Barnwell County Library, 2001 Haygood Avenue, Barnwell, SC 29812. These documents are also available for review at the EPA Records Center, 61 Forsyth Street, S.W., Atlanta, GA 30303.

Attachment C

Written Public Comments Received
During the Public Comment Period

<IMG SRC 98086N>

COMMENTS OF TEXTRON INC. ON PROPOSED PLAN
FOR THE SHURON SUPERFUND SITE

Textron Inc. ("Textron") submits the following comments on the United States Environmental Protection Agency's ("EPA's") Proposed Plan for the Shuron Superfund Site in Barnwell, Barnwell County, South Carolina. When EPA released the Proposed Plan in November 1997, it also initiated a public comment period which it later extended through February 4, 1998. Textron requests EPA's consideration of these comments prior to EPA's selection of a remedy and issuance of a Record of Decision.

INTRODUCTION

Textron has been involved in the remedial process at the Shuron Site since before November 22, 1994, the effective date of an Administrative Order on Consent with EPA, pursuant to which Textron performed a Remedial Investigation and Feasibility Study ("RI/FS") to investigate and to evaluate remedial alternatives for the Shuron Site. During the course of the RI/FS, Textron forwarded draft and final submittals, correspondence and other documentary materials to EPA reflecting Textron's views on various remedial alternatives and on other any event, it should be applied on a site-wide average basis. Further, the potential benefits of excavating the wetland sediments, as the Proposed Plan requires, are outweighed by the harm to the wetlands. Third, after contaminated soils on-site are excavated and treated, they should be permitted to be disposed of on-site using containment measures that are protective, but without requiring them to meet Subtitle D landfill criteria.

<IMG SRC 98086O>

With respect to groundwater, EPA's proposed remedy also is deficient. Following source removal and temporary groundwater extraction for dewatering and during an extended period thereafter, Textron agrees with EPA that additional data should be collected to evaluate the presence of residual groundwater contamination and the potential effectiveness of monitored natural attenuation as a groundwater remedy. Prior to such an evaluation, however, EPA's decision to require installation of a proactive groundwater treatment system is premature.

SPECIFIC COMMENTS ON PROPOSED PLAN

Textron's specific comments on EPA's Proposed Plan for the Shuron Site are as follows:

I. Issues Relating to the Proposed Remedy for Soils

The Proposed Plan establishes Remedial Goals ("RGs") or cleanup standards for several contaminants of concern in soils (including separate RGs for surface and subsurface soils in the upland areas of the site, and hydric soils or sediments in the wetland areas of the site). All soils exceeding these RGs are to be excavated and dewatered, treated through stabilization/-solidification and aeration, and disposed of on-site or off-site. In addition, following excavation of sediments from the wetlands, the wetlands must be restored.

Soils that are RCRA hazardous must be disposed of off-site. Soils that are RCRA non-hazardous must, at a minimum, be placed under an engineered cap on-site to prevent direct contact exposure; but if the soils leach above maximum contaminant levels ("MCLs"), they must be placed in an on-site cell meeting RCRA Subtitle D landfill criteria. Alternatively, if it is determined to be more cost-effective, soils that are RCRA non-hazardous may be sent off-site for disposal.

As explained below, the proposed soil remedy should be modified in several key respects.

A. Excavation of Upland Areas

Textron agrees with EPA's application of industrial cleanup standards to the upland areas of the site, but disagrees with the proposed application of a lead cleanup standard of 1150 mg/kg, which is too low.

1. EPA correctly determined that the site should be remediatad to industrial standards.

Textron agrees with EPA's determination in the Proposed Plan that the Shuron Site should be remediated to industrial standards. EPA's determination is consistent with the NCP and with EPA policy guidance (OSWER Directive 9355.7-04, Land Use Guidance) requiring consideration of the most likely potential future land use when selecting cleanup standards. Based on the historic use of this property, its present and future condition (regardless of the remedy), and the availability of other locations in the vicinity for residential use, the most probable future use of the Shuron Site is industrial. 1/

The only possible suggestion to the contrary is reflected in eleventh-hour statements from officials of Barnwell County and the City of Barnwell, following completion of the RI/FS process, in letters to EPA dated May 13, and May 20, 1997, respectively, and in more recent statements to EPA, that future residential use of the site might be appropriate. County and City officials have left no room for doubt, however, that their sole objective in this regard is to effectuate the removal of the former manufacturing building on-site. County and City officals, also have indicated they would not oppose the application of industrial cleanup standards to the portion of the site that is the subject of the Proposed Plan, if the building were removed from the site. As EPA has explained, however, the building was not part of the RI/FS process and its fate is irrelevant to the selection of a remedy for the site.

2. The lead cleanup standard in surface soils should be 1500 mg/kg, not 1150 mg/kg.

Although Textron, therefore, agrees with EPA's application of industrial cleanup standards to the site, it takes exception with the industrial cleanup standard EPA has proposed for lead, i.e., 1150 mg/kg. During the initial stages of the RI/FS, Textron proposed an industrial cleanup standard of 1500 mg/kg for lead, based on the results of the Baseline Risk Assessment performed as part of the RI/FS, EPA guidance on lead exposure, and lead cleanup standards applied at other Superfund sites. For the reasons reflected in Textron's earlier submissions to EPA, it continues to believe that an industrial lead cleanup standard of 1500 mg/kg should be applied at the Shuron Site.

1/ The FS Report analyzes remedies based solely on an industrial use scenario. Therefore, if for some reason EPA were to determine at this late date to apply a residential use scenario, there would be no basis in the administrative record for issuing a Record of Decision based on that scenario without redoing the FS.

In its December 1995 comments to Textron on the Draft RI Report, EPA instructed Textron to apply a lead cleanup standard of 1300 mg/kg, rather than 1500 mg/kg. EPA based cleanup standard on the goal of protecting the most sensitive worker in the industrial use scenario, a pregnant woman assumed to be working at the Shuron Site. EPA's assumptions underlying its calculation of the 1300 mg/kg cleanup standard for lead however, were wholly unrealistic and, therefore, overly conservative.

In particular, EPA assumed that a pregnant woman would be working outdoors at the site during all nine months of her pregnancy, and would be working seven days per week; that she would consume 50 mg of soil per day, all containing 1300 mg/kg lead, and mostly in bioavailable form; that she would have an average or above average blood lead level from other, non-site-related exposures; and that her fetus would be among the top 5 percent of fetuses with regard to iead sensitivity. The simultaneous consideration of each of these factors probably reflects a non-existent subpopulation of pregnant women; at most, it reflects a very small subpopulation of pregnant women, and an infinitesimal subpopulation of industrial workers.

Following EPA's calculation of a 1300 mg/kg lead cleanup standard based on these overly conservative assumptions, and after EPA's approval of the RI/FS which contained the 1300 mg/kg standard, EPA revised its calculation based on new assumptions regarding the homogeneity of the local population near the Shuron Site, and the application of more protective values of two parameters (the geometric standard deviation and the baseline blood level) to reach an even more conservative cleanup standard of 1150 mg/kg. This lower cleanup-standard is even less defensible than the 1300 mg/kg standard previously mandated by EPA, especially given that the latter formed the basis for the evaluation of remedial alternatives contained in the RI/FS which was approved prior to EPA's recalculation of this critical cleanup standard.

In short, Textron's proposed cleanup standard of 1500 mg/kg was based on realistic assumptions about the future use of the site, consistent with the NCP and EPA guidance; EPA's 1300 mg/kg standard, mandated in the RI/FS, was based on overly conservative assumptions that did not justify that lower cleanup level; and EPA's further revision of the standard downward to 1150 mg/kg, following completion of the RI/FS, is even less reflective of the realistic risk associated with the Shuron Site.

3. The cleanup standards in subsurface soils should be refined during the remedial design.

EPA' s Proposed Plan states that the lead cleanup level in subsurface soils "shall be determined during RD/RA [Remedial Design/Remedial Action]." Textron does not object to EPA's decision to defer determination of the lead cleanup level, as long as the cleanup level is based on leachability criteria reflecting the potential impact of lead leaching to groundwater, and not on toxicity criteria. Textron reserves any additional comments on the lead cleanup level pending EPA's determination during the remedial design process.

With regard to the cleanup levels for organic contaminants in subsurface soils, however, EPA likewise should defer determination of the final cleanup levels pending the collection of additional data during remedial design. The cleanup levels that EPA has listed in the Proposed Plan were based on a relatively limited number of data points. EPA should retain the flexibility to collect additional data for the purpose of defining the cleanup levels for organic contaminants in subsurface soils more carefully.

B. Excavation of Wetland Areas

Textron disagrees with EPA's determination that remediation of wetlands sediments is required. The proposed application of a lead cleanup standard of 700 mg/kg is too low and, in any event, should be applied on a site-wide average basis. Moreover, whatever lead cleanup standard is applied, any benefits of wetland remediation are outweighed by the harm that would be caused to the wetlands.

1. The lead cleanup standard in wetland sediments should be at least 2000 mg/kg, not 700 mg/kg, and should be applied on a site-wide average basis.

During the RI/FS, a Tier II Baseline Ecological Risk Assessment ("BERA") was performed at the Shuron Site to determine whether historical discharges into the forested floodplain east of the facility pose potential hazards to that wetland habitat or to the populations of ecological receptors that inhabit or frequent that system. The BERA was based on the extensive site investigation performed during the RI, augmented with a focused ecological field program that involved the collection of additional site information on the ecology of the floodplain and the performance of empirical studies assessing the impact of site-related contaminants on key ecological receptors.

Consistent with EPA policy, the BERA reviewed the impact of site-related contaminants on population and community endpoints, rather than on individual organism endpoints. EPA policy provides for the consideration of individual organism endpoints only where certain designated sensitive organisms (e.g., rare, threatened, or endangered species) are present at a site. Since no such sensitive organisms are known to occur at or in the immediate vicinity of the Shuron Site, it was appropriate to assess ecological risks to populations and communities of ecological receptors.

The BERA indicated that lead is the primary contaminant of ecological concern in the wetland areas, with concentrations in sediments ranging from at or near background levels (10 to 36 mg/kg) to a maximum of approximately 10,000 mg/kg. Based on the results of the empirical laboratory studies, food web exposure modeling of upper trophic level vertebrate wildlife, and field reconnaissance by experienced field ecologists, it was determined that historical discharges of site contaminants, in particular lead, have had little or no substantive, adverse impact on the forest floodplain wetland ecosystem or on the aquatic ecosystem of nearby Turkey Creek. Likewise, it was determined that the populations of ecological receptors inhabiting or frequenting wetland areas are not at significant risk from site-related contaminants. Accordingly, the BERA as originally submitted by Textron to EPA as part of the Draft RI Report in December 1995 concluded that it was not necessary to develop a remedial goal objective ("RGO") for addressing ecological risk at the Shuron Site.

Notwithstanding these conclusions, EPA subsequently instructed Textron to develop an RGO for addressing lead in wetland sediments, and in particular, to develop an RGO that would be protective of invertebrate receptors (i.e., the lowest ecological level of receptors) at the site. In accordance with EPA's instructions, Textron revised portions of the Draft RI and the Draft FS to develop an RGO for lead in wetland sediments, which EPA selected as 700 mg/kg in the Proposed Plan. Throughout, the RI/FS process, however, Textron has maintained its position that the potential site effects on the wetland ecosystem do not justify active remediation at all, and certainly do not justify the application of a 700 mg/kg lead cleanup standard.

To summarize Textron's position:

First, it is appropriate to measure the need for remediation against the impact of site contaminants on the ecosystem as a whole. From that system-wide ecological perspective, neither the wetland ecosystem or the nearby aquatic ecosystem, nor the populations of ecological receptors therein, have been significantly impacted by site contaminants to justify remediation or the development of an RGO.

Second, even if the development of an RGO could be justified, the preliminary remediation goals ("PRGs") established for the ecological receptors at the site -- i.e., avian receptors (11,900 mg/kg), mammalian receptors (11,000 mg/kg), amphibian receptors (2,000 mg/kg), and invertebrate receptors (700 mg/kg)-- exceed the existing average lead concentration of 1240 mg/kg at the site, with the sole exception of invertebrates. It is more appropriate to base an RGO on the higher levels of ecological receptors, based on their importance to the food chain, their mobility, and the greater reliability of the ecological assessment studies that were performed on them.

Third, to the extent it were appropriate to base an RGO on the invertebrate receptors, actual size conditions do not support a finding that invertebrates will realistically be subjected to lead levels above 700 mg/kg. The wetland areas with lead concentrations above 700 mg/kg are generally covered by organic vegetative mats that limit exposure to mammals, amphibians and invertebrates to invertebrates. In contrast, sediment samples used in invertebrate toxicity tests were collected after the vegetative mat was removed, thus representing an exposure inconsistent with site conditions. Further, even apart from the location of contaminated sediments below the vegetative mat, the existing average lead concentration at the site is likely to be substantially lower than 1240 mg/kg, because that figure is based on sampling results from the most contaminated areas of the site.

Fourth, if an RGO were selected for lead in wetland sediments, it should be applied on a site-wide average basis. Populations and communities of invertebrates, like other receptors at the site, are generally exposed to site-wide lead concentrations, rather than to individual "hot spots." Consistent with the goal of basing risk management decisions on criteria protective of populations and communities, not individual organisms, at the Shuron Site, an RGO of 700 mg/kg or otherwise for lead should be applied as a site-wide average. That is, the need for remediation, if any, should be based on whether the site-wide average lead concentration throughout the wetland areas falls before the cleanup standard.

The site-wide average, by definition, should be calculated for the entire wetland area, and not for each isolated wetland area on-site. Further, it should take into account the fact, as noted above, that existing wetland soil data reflect an overly conservative, location-biased sampling plan designed to take samples where concentrations of contaminants of concern were expected to be elevated. For example, much of the eastern portion of the wetland area was not sampled, because it did not appear to be affected by site contaminants. 2/

2/ As referenced above, Textron has stated its position to EPA on these issues throughout the RI/FS process. For example, in an April 17, 1996 submission to EPA, Textron explained its objection to EPA's inclination toward selecting a 700 mg/kg lead RGO, for reasons that included the following: the wetland areas with lead concentrations above 700 mg/kg are generally covered by organic vegetative mats that limit exposure to mammals, amphibians and invertebrates; sediment samples used in invertebrate toxicity tests were collected after the vegetative mat was removed, which represented an exposure inconsistent with site conditions; exposures by mammals and amphibians are limited due to flooding conditions; observations by trained ecologists have not indicated any reduced population activity by any species in wetlands at the site; tissue studies of amphibians collected in the wetlands (which provide a more realistic assessment of ecological exposure than the other studies performed) did not indicate bioaccumulation of unacceptable levels of lead; plant toxicity tests did not indicate any phototoxicity from sediments in the wetland areas; and the disruption of the wetlands caused by removing sediments would create excessive damage. Textron expressly reserved its right to raise these issues during the public comment period, and it hereby incorporates its earlier submission into these comments on the Proposed Plan.

2. The potential benefits of excavating the wetland sediments are outweighed by the harm to the wetlands.

For the reasons explained above, the ecological risk assessment that has been performed at the Shuron Site does not justify the selection of a lead cleanup standard for wetland soils. Even if the remediation of wetland soils were otherwise justified, however, the potential benefits of excavating the wetland sediments are far outweighed by the ecological harm.

Both EPA and the Department of the Interior have previously acknowledged the need to compare the potential benefits of wetland remediation with the potential harm to the wetland. For example, an EPA Science Advisory Board report on relative ecological risks in 1990 recommended that EPA consider the relative risks of remedial strategies, particularly as they relate to natural ecosystem destruction. Thus, habit alteration may result in greater relative risk to ecological receptor populations and communities than environmental contamination.

Based on the lack of human health risk from exposure to wetland soils at the Shuron Site, and the limited adverse ecological impacts described in the BERA, the potential benefits of wetland remediation at the site are, at most, relatively modest. At the same time, however, remediation of lead in the wetland soils would cause significant ecological impacts from habitat alteration, including: the destruction of wetland vegetation; the alteration of wetland hydrology; the alteration or reduction of wildlife habitat (including food, shelter, over-wintering, and breeding areas); and the alteration or reduction of wetlands functions (including flood water storage, surface water purification, sediment pollution absorption, and sediment load deposition).

Contrary to sound ecological policy and guidance from within its own agency, EPA in its Proposed Plan does not even evaluate the impacts of wetland alteration associated with the proposed remediation. It is difficult to understand the wholesale absence of such an evaluation, or how it is consistent with EPA's obligation under the NCP to consider ecological impacts in the remedial process. In short, even if wetiand remediation otherwise could be justified based on the ecological risk assessment, which Textron disputes, EPA has not begun to perform the necessary balancing of potential benefits and risks associated with wetland alteration.

C. Disposal of Excavatad and Treated Soils

Textron agrees with EPA's determination that off-site disposal of RCRA non-hazardous soils should be permitted if, during the remedial design and remedial action, it is determined that off-site disposal would be more cost-effective than on-site disposal. 3/ Textron disagrees, however, with EPA's determination that RCRA hazardous soils must be disposed of off-site. Textron also disagrees with EPA's determination that soils disposed of on-site must be contained in a cell meeting Subtitle D landfill criteria.

1. All excavated soils should be allowed to be disposed of on-site.

3/ As described in the FS Report, and in subsequent submissions by Textron to EPA, the estimated costs associated with off-site disposal are substantially higher than for off-site disposal. Further, there is a much higher degree of uncertainty associated with the costs for off-site disposal. Therefore, unless it is determined during the remedial design and remedial action that the costs of off-site disposal are lower than anticipated (based, for example, on the volume and hazardous component of contaminated soils), on-site disposal is the preferred option. Textron hereby incorporates its earlier submissions on costs into these comments on the Proposed Plan.

For reasons Textron has previously discussed with EPA, and as explained in the FS Report, Soil Alternative 3 -- which provides for placement of all excavated soils (i.e., RCRA hazardous and non-hazardous soils) under an engineered cap – protects the environment and is cost-effective. In particular, under Soil Alternative 3, excavated soils will be placed at least three feet above the seasonably high water table in the areas where the cap is to be constructed. Clean fill will be added if necessary to create this separation. Initial lifts will be of metals contaminated soils that are RCRA non-hazardous, and other soils will be placed in upper lifts where they will be provided maximum protection from coming in contact with groundwater. The cap will include a low permeability, flexible membrane liner ("FML") cover layer. In addition, soil vapor extraction ("SVE") laterals may be placed beneath the cap, through the soils containing volatile organic compounds ("VOCs"), unless the limited volume and concentracions of VOCs do not justify SVE or it is determined during remedial design that SVE would not be effective.

The design features of this alternative protect the groundwater against the leaching of contaminated soil by placing excavated soils well above the water table and by constructing a engineered cap that significantly limits infiltration of surface water. Further, in order to confirm the long-term effectiveness of Soil Alternative 3, modeling of potential leaching effects was performed using EPA's Hydrologic Evaluation of Leaching Potential ("HELP") model. The results of the modeling, presented in Appendix E to the FS Report, demonstrated that leaching of soils beneath the cap will not exceed MCLs in the groundwater. As described below, following submission of the FS Report, Textron also responded to each of EPA's stated concerns about the potential for leaching of site contaminants above MCLs.

In response to this careful technical analysis, EPA's Proposed Plan states dismissively in one sentence that there is "high uncertainty" this alternative will be sufficiently protective, "because of the potential to leach contaminants to the groundwater above MCLs." Proposed Plan, at 25. 4/ EPA does not explain, however, why the elements of the proposed design will not reduce that potential to acceptable levels, or why the HELP modeling does not accurately reflect potential leaching. Based on uncontroverted information in the administrative record, there is no legitimate technical basis to preclude the on-site disposal of RCRA hazardous and non-hazardous soil underneath an engineered cap.

2. Soils that are disposed of on-site need not be contained in an on-site cell meeting RCRA Subtitle D landfill criteria.

For the reasons described above, even if RCRA hazardous and non-hazardous soil is disposed of on-site, placement of contaminated soils above the water table and underneath an FML cap is protective of the environment. Even more clearly, if only RCRA non-hazardous soil is disposed of on-site (consistent with EPA's Proposed Plan), placement of those soils underneath an engineered cap is protective.

EPA's Proposed Plan nonetheless adopts Soil Alternative 3B, which requires the placement of RCRA non-hazardous soils that leach above MCLs in an on-site cell meeting RCRA Subtitle D landfill criteria. Following approval of the Final FS Report, EPA expressed several concerns to

4/ EPA also dismisses Soil Alternative 3A, which would provide for the placement of RCRA hazardous and non-hazardous soils in a containment cell with a bottom liner to provide additional protection to groundwater, because "there is some uncertainty as to whether [RCRA] hazardous waste . . . will leach from the landfill." Proposed Plan, at 25. EPA's decision making based on a subjective, unsubstantiated view of the various levels of "uncertainty" is no substitute for sound technical review of the data and modeling results.

Textron about the placement of excavated soils beneath an engineered cap, without meeting RCRA Subtitle D landfill criteria. These concerns related broadly to the impact on groundwater of (1) short-term, transient drainage following placement of the excavated soils, and (2) rainfall-related leachate generation.

Textron responded to each of these concerns, however, at a meeting with EPA on August 6, 1997, and in other discussions and written submissions prior to EPA's issuance of the Proposed Plan. As explained below, and again based on uncontroverted information in the administrative record, there is no legitimate technical basis to require the construction of an on-site containment cell meeting Subtitle D landfill criteria.

First, with respect to impact of short-term, transient drainage, EPA had explained its concern that if contaminated soils from the saturated zone were excavated and placed directly beneath a cap without removing any of the water in the soil pores, then excessive amounts of water would drain from the soils to groundwater during the initial weeks to months and would potentially exceed MCLs. In connection with that concern, EPA also stated that Textron had failed to demonstrate in the Final FS Report the effectiveness of the soil drying that would occur prior to placement of the soils under the cap in Alternatives 3, 3A and 3B.

In fact, however, dewatering of soil with lime or other chemical agents is a well-established remedial process. 5/ It is more appropriate to conduct a site-specific treatability test (i.e., to select the best chemical agent and optimum dosage) in the remedial design phase, rather than during the FS process. Further, it is reasonable to assume for FS purposes that a drying operation for the soils at the Shuron Site can be implemented to essentially eliminate all moisture above the field capacity of the soil (i.e., any free water that would otherwise drain out of the soil). 6/ Indeed, even before any chemical drying of the soils, much of the free water in soils from the saturated zone may be removed via soil dewatering in the areas to be excavated; natural drainage during the excavation process; and drainage during temporary stockpiling of the soils on a construction pad with controlled drainage.

Given all of these factors, there is only a remote likelihood of any significant drainage of residual pore water following the on-site placement of soils excavated and dried at the Shuron Site. In contrast, EPA's concern about transient drainage is based on an assumption (in EPA' s own modeling analysis) that there will be no drying of the soils prior to placement in the on-site containment areas. That basic premise of EPA's modeling analysis is wrong.7/

5/ For example, documentation of the demonstrated nature of drying operations for soils can be found in EPA's technical resource document, Solidification/Stabilization and its Application to Waste Materials, Report No. EPA/530/R-93/012, June 1993.

6/ EPA has estimated that the field capacities of the soils at the Shuron Site range from .22 to .378 (i.e., 22% to 37.8% by volume). W. O'Steen Memorandum to S. Panabaker, Re: Review of HELP Analysis of Soil Remedial Alternative 3, Shuron Site, Barnwell, South Carolina (July 2, 1997). It should only be necessary to reduce the moisture content of the soils below those volume percentages to reach a condition that will result in no soil drainage. A well-operated drying operation with adequate mixing should be able to reduce the moisture content well below these levels.

7/ To account for this critical deficiency, EPA has notedthat, even if the amount of projected transient drainage (based on EPA's modeling analysis) were reduced by a factor of ten (10), some MCL exceedances for the contaminants DCE and TCE were predicted. In fact, however, this reduction by a factor of ten(10) does not adequately reflect the effect of the drying process. For example, application of EPA's reduction factor to the soils in the fill/debris areas of the Shuron Site would reduce the Moisture content from 46.3% to 25.5%. This is an unreasonably low drying efficiency to assume from site dewatering, and soil excavation, stockpiling and drying. Further, the drying process does not need to reach zero moisture to eliminate drainage; it has only to reach the field capacity (23.2% in the example provided).

Likewise, EPA's concern about the need to consider the effect of site-specific conditions (e.g., the use of three separate containment areas) and soil emplacement scenarios (e.g., the non-uniform mixing or layering of wastes) is misplaced, because those issues become a factor only under the incorrect assumption that the soils will be placed without draining or drying.8/

Moreover, even under the most unlikely circumstances, if there were some measurable transient drainage following placement of excavated soils, this would lead only to a brief extension of the time during which certain contaminants in the groundwater exceed MCLs in certain locations. Any time extension would be on the order of a few weeks to a few months -- compared to the lengthy period of years during which the groundwater has already been impacted by site contaminants and will continue to be impacted in the future. The incremental impacts of transient drainage, if any, would be negligible.

Second, EPA also had expressed its concern about the possible impact of rainfall-related leachate generation on groundwater. In response, however, Textron used a combination of laboratory data and modeling to show that any such leaching would not cause MCLs to be exceeded outside of a reasonable mixing zone. The basic approach and modeling tools used in this analysis were the same as EPA used in analyzing the impact of transient drainage: the HELP model to predict the amount of water that will infiltrate soil and migrate to groundwater; and the Summers model to estimate the resulting concentrations of site contaminants in the groundwater after a reasonable amount of local dilution.

Textron's model calculations assumed an overly conservative leakage of rainfall through the cap covering the contaminated soils, higher than that which would be expected from a properly installed and maintained cap. Nevertheless, EPA expressed a concern about Textron's evaluation of rainfall-related leachate generation based on modeling results, without actual treatability data. As explained above, however, it is more appropriate to conduct a site-specific treatability test (or a bench or pilot scale demonstration) in the remedial design phase. Further, if EPA deemed it necessary, it could expressly require treatability studies or establish performance criteria in the selected remedy.

EPA also expressed a concern that the use of average concentrations of soil contaminants, rather than maximum concentrations, to estimate initial leachate concentrations in the model calculations was not sufficiently conservative. In fact, however, the model calculations in the Final FS Report used "average" contaminant concentrations that were biased high by the exclusion of values below the Remedial Goal Objectives for each contaminant. Accordingly, these "averages" were higher than the actual average concentrations of contaminants to be disposed of on-site. Further, the commingling of contaminated soils, the commingling of leachate from different areas of contaminated soils, and the subsequent mixing with the groundwater, will average out any peaks in the leachate concentrations.2/ For all of these reasons, the use of average concentrations of soil contaminants is the most reasonable approach.10/

8/ In addition, even EPA's modeling analysis concluded that the total transient drainage from beneath the capped areas is roughly the same, regardless of the soil emplacement scenario.

2/ Textron explained these points in a letter to EPA dated June 6, 1997. Textron hereby incorporates its earlier submission into these comments on the Proposed Plan.

10/ Indeed, EPA's own model calculations used average concentrations of soil contaminants, which were also biased high.

II. Issues Relating to the Proposed Remedy for Groundwater

The Proposed Plan requires the removal of contaminated soils from contact with the groundwater, and the use of a temporary groundwater recovery and treatment system for dewatering purposes during the source removal and for an additional four to six months thereafter. The proposed remedy also includes an evaluation period for gathering data to design a proactive groundwater treatment system (pump and treat, recirculation wells, air-sparging, or a combination). If, during the evaluation period, monitored natural attenuation can be demonstrated to be as effective as active remediation, within a comparable time frame, then that approach will be applied to the appropriate portions of the contaminated groundwater plume.

Certain aspects of the groundwater remedy -- i.e., source removal, the use of a groundwater treatment system for dewatering and for an additional period of several months, and the evaluation of groundwater conditions following theseactivities -- are reasonable. As explained below, however, EPA's decision to design and install a proactive groundwater treatment system prior to completion of the groundwater evaluation has no support in the administrative record.

In particular, a proactive groundwater treatment system cannot be justified at this juncture, because: (1) there is no current use and there is no reasonably foreseeable future use of site groundwater for human purposes; (2) there is no evidence of off-site migration of the groundwater contamination plume; (3) the source removal and temporary groundwater treatment will significantly improve groundwater conditions; and (4) following those activities, it is anticipated that natural attenuation will dissipate any remaining groundwater contamination over a reasonable time frame.

To summarize Textron's position:

First, there is no realistic exposure to human receptors from the groundwater contamination plume on the Shuron Site. There are no water supply wells on-site, and the closest water supply wells are a City of Barnwell well upgradient of the site and only one private well within one-half mile of the site. Further, based on the availability of municipal water in the area, and the industrial character of the site, there would be little or no incentive for a future site owner or tenant to install an on-site well for any purpose.

Hydrogeological limitations at the Shuron Site also would discourage installation of an on-site well. As explained in the RI Report, pump test data indicate that the aquifer underlying the site has a relatively low yield and would not be very productive.

Likewise, institutional controls, present or future, would restrict groundwater use at the site. Based on information from the City of Barnwell, Textron believes that groundwater extraction from the site may already be restricted by local ordinance. In any event, EPA's proposed remedy provides for the imposition of deed restrictions and well permit restrictions that would preclude groundwater use.

Second, there is no evidence that the groundwater contamination plume is migrating off-site. The only potential indication to the contrary is reflected in questionable data from two shallow monitoring wells, MW-245 and MW-247, on the southern side of the site, which show only low parts-per-billion concentrations of a few VOCs. A second sampling of one of those wells, however, showed no detectable level of VOCs, and data from intermediate and deep groundwater wells show no evidence of any off-site migration.

In addition, hydrogeological data for the site indicate that most of the shallow groundwater, especially in areas with VOC contamination, discharges to the wetlands or to the southern drainage ditch (where the VOCs volatilize) and will not be transported to off-site areas south of the old railroad bed. The hydrogeological data-also indicate that significant portions of the intermediate and deep groundwater also may discharge to the southern drainage ditch. These hydrogeological data undermine any suggestion that an appreciable portion of the groundwater contamination plume, if any, is migrating off-site.

Moreover, even if there were a legitimate issue whether off-site migration were occurring, based on the limited available data, those limited data are far from sufficient to be the basis for a major decision on groundwater remediation. Essentially all of the available groundwater data result from one or two sampling rounds in the summer of 1995. The concentrations of groundwater contaminants and the groundwater flow regime could change significantly over time, and from season to season. Absent additional data, certainly, EPA should not be selecting an extensive, proactive groundwater remediation system that may have little, if any, marginal benefit.11/

Third, there is very strong reason to expect that the proposed remedial actions other than proactive groundwater remediation will have a very positive impact on groundwater quality at the site. Groundwater quality will benefit both from the removal and containment of source material (i.e., the contaminated soils that would otherwise continue to leach contaminants into the groundwater) and the temporary groundwater system for dewatering activities and additional treatment.

Soils contaminated with VOCs are acting as an active source of groundwater contamination. Based on available data, a majority of these soils may be located below the water table, within the shallow aquifer. Excavation and removal of these soils, therefore, will have a significant beneficial impact on groundwater conditions. Further, the dewatering activities, which are a necessary adjunct to source removal, will result in a major, additional reduction in the mass of contaminants in groundwater. The proposed remedy provides for an extensive, dewatering wellpoint system (with an estimated 63 wellpoints) to dewater the source areas during excavation and for a period of four to six months thereafter.

Textron has previously submitted to EPA estimates of the reduction of mass contaminants in groundwater from source removal and dewatering activities, and model calculations showing that the potential for off-site contaminant migration will thereby be substantially reduced. Absent actual field data following source removal and dewatering, it is difficult to quantify the beneficial effects of these activities. Based on the expected, substantial improvement in groundwater quality, however, EPA should not decide the need for a proactive groundwater system without the benefit of additional data.

Fourth, active groundwater remediation is not necessary at the Shuron Site unless natural attenuation, properly monitored over a sufficient period of time, is determined to be substantially less effective. The movement in groundwater of VOCs, the only site-related contaminants that have any significant potential for off-site migration, is attenuated via a combination of soil sorption and biodegradation. Given sufficient time and favorable natural conditions, these attenuation mechanisms can reduce contaminant concentrations in groundwater by orders of magnitude.

11/ Likewise, even if additional data were to show a marginal off-site impact, that would not necessarily justify a proactive groundwater remediation system. An evaluation of groundwater remedial alternatives (including the use of natural attenuation) must balance several NCP criteria, including the risks associated with any off-site migration, and the likely effectiveness and costs of the various alternatives. Especially at the Shuron Site, where any off-site migration would likely, affect, at most, a small area of a downgradient wetland area whose groundwater is not being used, any evidence of off-site migration should not be dispositive.

At the Shuron Site, there is no question that attenuation mechanisms are operative. For example, the RI Report contains data showing the extent of soil sorption.12/ It also contains evidence of biodegradation based on the presence of biodegradation products of various VOCs in the groundwater (e.g., dichloroethylene and vinyl chloride as breakdown products of trichloroethylene and tetrachloroethylene). Model calculations also indicate that natural attenuation mechanisms may be of comparable effectiveness as proactive groundwater remediation.

Additional evaluation of the natural attenuation remedy before selecting a proactive groundwater remedy is also directly supported by EPA's new guidance document on the subject.13/ The policy document explains that natural attenuation is particularly appropriate in conjunction with source control and removal activities, and where the groundwater contamination plume is not expanding and the risks to human and ecological receptors are acceptable.14/ Further, the impacts of any ongoing or proposed remediation "should be factored into the analysis of natural attenuation's effectiveness;" and with regard to chlorinated solvents, in particular, "the potential for cutting off sources of organic carbon (which are critical to biodegradation of the solvents) should be carefully evaluated."15/ Generally, a decision to employ monitored natural attenuation "should be thoroughly and adequately supported with site-specific characterization data and analysis."16/

Each of these considerations under EPA's new policy document favors more active evaluation of monitored natural attenuation as the groundwater remedy at the Shuron Site. Especially in light of the proposed source removal and dewatering activities, which will enhance natural attenuation by significantly lowering the strength of the source, EPA should defer a decision on the need for proactive groundwater remediation until after the completion of the soils remedy and the collection of additional groundwater data. At that time, EPA will be in a better position to compare the effectiveness of alternative groundwater remedies, including their remediation time frames -- which EPA's policy document emphasizes17/ and which EPA's Proposed Plan also notes as a critical issue.

12/ An aspect of soil sorption that is not documented in the RI Report is contaminant sequestration (i.e., permanent sorption) in the soils. Recent studies have shown that significant fractions of sorbed contaminants are essentially permanently bound to the soils and are not easily, if at all, released to the surrounding groundwater. The extent of such sequestration likely increases with time. References for this phenomenon include: Pignatello, J.J. and B. Xing, "Mechanisms of Slow Sorption of Organic Chemicals to Natural Particles," Environ. Sci. Technol. - 30 (1) : 1-11 (1996); Linz, D.G. and D.K. Nakles, Environmentally Acceptable Endpoints in Soil, American Academy of Environmental Engineers, Annapolis, MD (1997).

13/ Use of Monitored Natural Attenuation at Superfund, RCRA Correction Action, and Underground Storage Tank Sites, OSWER Directive 9200.4-17 (November 1997).

14/ Id. at 13, 15.

15/ Id. at 12.

16/ Id. at 10-11.

17/ Id. at 15-16.

Indeed, EPA acknowledges in its Proposed Plan that, following the soils remedy, monitored natural attenuation may be demonstrated to be as effective as active remediation, within a comparable time frame. If the collection of additional data may soon demonstrate a preference for natural attenuation, however, the selection of a proactive system now cannot possibly be justified. The need for additional data for sound decision making outweighs any administrative convenience associated with selecting a remedy prematurely.

CONCLUSION

Although EPA's Proposed Plan contains several reasonable components, it nonetheless requires modification to be consistent with the NCP, to find support in the administrative record, and to reflect rational remedial decision making.

As explained in detail above, the proposed soils remedy should be modified to increase the cleanup level for lead in surface soils, and to allow for refinement of cleanup levels in subsurface soils during remedial design; to avoid remediation of wetland sediments, or at least to reduce the area of remediation by increasing the cleanup standard for lead and applying it on a site-wide average basis; and to permit disposal of all contaminated soils in an on-site containment area that is protective of the environment, but is not required to meet Subtitle D landfill criteria. The proposed groundwater remedy should be modified to defer a decision on the need for proactive groundwater remediation until after the implementation of source removal and dewatering activities, so that additional data can be collected to evaluate the improvement in groundwater conditions and the potential effectiveness of monitored natural attenuation.

Textron respectfully submits these comments to EPA for its consideration.

Attachment D

Official Transcripts of the Proposed Plan Public Meetings

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SHURON SUPERFUND SITE PROPOSED PLAN MEETING

before Alice D. Boni, Court Reporter

held at the Barnwell County Council Chambers

Barnwell, South Carolina

on Tuesday the 9th day of December 1997

commencing at 7:00 p.m.

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APPEARANCES

FOR THE EPA:	Sheri Panabaker Jan Rogers Cynthia Peurifoy Kevin Koporec Ralph Howard
FOR S.C. DHEC:	Gary Stewart Yanqing Mo
FOR U.S. AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY:	Eric Melaro

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MS. PEURIFOY: Good evening, everybody. My name is Cynthia Peurifoy. I'm with the Environmental Protection Agency in Atlanta, Georgia, the Superfund Program, and I'd like to welcome you this evening for the Proposed Plant Meeting for the Shuron site that's located here in Barnwell County, South Carolina.

I'd like to start off by thanking the officials of Barnwell County, Mr. Gripp and the County council for allowing us to have the meeting here tonight and helping us in making all the arrangements necessary for this meeting.

And I'd also like to do some introductions. First of all, I'll start off with all the individuals that are here from EPA. First of all, we have Sheri Panabaker, who is the Remedial Project Manager for the site. She's going to be speaking to you quite a bit this evening. We also have Jan Rogers, who's the Chief of the South Carolina section of the Superfund Program in Atlanta. We also have Ralph Howard here, who's another Project Manager who's assisted on this site. We have Kevin Koporec who is from our Risk Assessment Office, who's also going to be speaking to you tonight.

From the South Carolina Department of Health and Environmental Control, Gary Stewart is here;

he's the Chief of the South Carolina section of the Superfund Program. And also Yanqing Mo is here, who's a hydrologist for the State. And also Eric Melaro, who is with the Health Hazard Evaluation Section of DHEC.

Did I miss anybody?

MR. HOWARD: That's all.

MS. PEURIFOY: Okay. Now, as you see, we have quite a full agenda tonight, so we're not going to spend too much time. I just wanted to go over a few things with you.

First of all, I'm going to talk a little bit about the Superfund process, and just to say, as you can see, we've done quite a bit so far on the Superfund process on this site. The site is on the National Priorities List. We've done the remedial investigation and feasibility study, and we're now, which is block five here, we're at the public comment period to gather comments on what has transpired so far on this site.

After that, I'm going to go a little later, but you can see there are some other steps, but after Sheri's presentation, I'm going to talk a little bit about what happens next after tonight's meeting.

I wanted to go over a few community relations highlights with you, and I'm going to start off with something that I think is really important to talk about. It's the Technical Assistance Grants Program. It's a program that EPA established to give communities an opportunity to have a technical advisor available to help you go through all those volumes of information that we produce in evaluating and coming up with alternatives to clean up the site.

It's a $50,000 grant. You have to do a 20 percent match, but you can do that through in-kind services, donations, things of that nature. You must prepare a plan. You have to have a written plan, but we can help you with that if you want to apply. We can help you with the plan. It just kind of shows what you're going to do with the funds and how you plan to address other community concerns, bring the larger community into the fold.

You can also hire what we call a grant administrator who handles all your paperwork, sends in the reports that EPA has to have whenever we give out a grant of this nature.

You cannot use a TAG grant to develop information regarding a lawsuit, and you cannot use a TAG grant to do your own sampling of the Superfund site. The group must be incorporated and must be non-profit, and must represent people who live near the site.

I also wanted to cover with you that we

have an information repository set up for this site here in Barnwell at the Barnwell Library on Hagood Avenue. That is a file that contains all the documents that were put together on the remedial investigation and feasibility study, and many other documents that make up what EPA used in making this decision to propose the alternatives that we're going to be talking about tonight.

I also want to mention to you that we've already extended, have a request and we have extended the public comment period. Right now, it will end February 4th. We have also been asked by Mr. Gripp to do an additional meeting to gather additional community comments, and we do plan to do that also sometime--I think it's going to be sometime mid to late January, but we'll get a date.

If you haven't gotten anything in the mail from us directly, if you pick up a facts sheet tonight, there's a--if you didn't, there's some outside. If you would fill out the little block on the back page that talks about the mailing list for the site and give it to met before tonight is over, I will make sure you get on our mailing list and we'll get that out to you so you'll be notified of the next meeting.

I think, with that, I just want to set

the stage for tonight's meeting. We do have a lot of information to cover. We're going to ask you to not necessarily don't ask questions until the end, but if you have something that you need clarification on during the presentation, then we don't mind those type of questions, but if you have comments about the proposed plan, itself, or just general statements you'd like to make on the record, if you'll wait until the presentations are over, that would help us a lot to keep things moving.

And I think that's it. I think I will turn it over to Ms. Panabaker.

MS. PANABAKER: Thanks, Cynthia. Hopefully, all of you have got an agenda. She had it up on the overhead a minute ago, the questions I want to mention tonight as I go through my presentation. I'm going to give a little site history, followed by the sampling that we did and the results that we found, followed by the-- you can't hear me. Is this any better?

Anyway, we'll go through the sampling we've conducted and the results that we've gotten from that; the risks posed by the site, which is not a current risk. There's not a current risk to nearby residents, but there is a future risk. This will be followed up by the various ways we looked at to clean up the site and then the way EPA thinks is the best way to clean up the site and why we think so, and then I'll open it up for questions.

The site is located at 100 Clinton Street and it consists of one main building of about 180,000 square feet. There's a fence around most of the building, or around the building, and also down through the wetlands quite a ways.

There was a removal action done inside the building in 1994, in which drums were removed that had been left by Shuron, Inc.

The facility began operations in about 1958 and operated until around 1992. Textron owned it from around '58 to 1985, and then it was sold to Shuron, Inc., who operated it until bankruptcy in '91/'92. They manufactured eyeglass lenses and some frames and used grinding and polishing compounds which were discharged into--were put into a wastewater treatment plant and discharged into four wastewater lagoons out back. When the lagoons would get filled, they would--the solids would be removed and placed into what are called solid ponds. The wastewater, itself, was discharged through an MPDS permit towards Turkey Creek.

The site was final on the National Priorities List in December of 1996. However, we got an early action started on this project in November of 1994 with--between Textron and EPA for Textron to do the remedial investigation and feasibility study. An order was signed in 1994. EPA did oversight of the work done by Textron.

The first phase of that work was to go out and collect surface soil, subsurface soil, sediment and surface water and groundwater samples to determine contamination. We collected samples and determined that there was approximately seven or eight volatile organics located in the soils and the groundwater. In the soils was four metals; lead, copper, arsenic, and zinc.

This chart shows you the maximum concentrations that we found of each of the individual contaminants, of the main contaminants that were found out there. The top right chart also shows the comparison of what was in the groundwater to the drinking water standards.

We also learned that a lot of the soils are clay and saturated where the contamination is. That's the result of subsurface samples. Subsurface samples are anything one foot or greater below land surface.

The next figure shows the areas that we found soil contamination. Those are the main areas. The upper top right corner is what we're calling the north drainage ditch, which is where the wastewater was discharged, in that direction. The top four lagoons are the four wastewater lagoons, and the two underneath it are the solid ponds. Contamination was also found out in the southern wetlands, or what we're calling the southern wetlands, which is the lower half of this figure.

The next figure shows where we found groundwater contamination. Clinton Street is to the left. We also sampled the City well and it did not show any site contamination in it.

Once we collect samples, we then do what's called a baseline risk assessment which serves as determining if there's any current or future risk posed by the contamination at the site. And at this time, I'd like Kevin to come up and tell you a little bit about that.

MR. KOPOREC: The risk assessment process is one of the tools that EPA--can you hear me all right from here? I've got a pretty loud voice. Risk assessment is just one tool that EPA uses to determine the need for cleanup and also the amount of cleanup that needs to be done as far as chemical specific levels at a given site. And here's just a little schematic which shows you the risk assessment process.

Where we start off is identifying the

hazard, which is basically what Sheri has been talking about; looking at the different chemicals that we find on the site and all the different media, and determining what's there that could be a problem, as far as a risk goes; as far as what we know about toxicity and cancer-causing agents.

What we do then is we calculate an exposure assessment where we look at different scenarios where people could be exposed either in a--both in a current scenario, what's going on now at the site, and what could happen in the future at the site, if it stays as it is now.

Then we put that together with the toxicity information that we have about the different chemicals from the site, what's called a dose-response assessment. And putting those two things together, we come up with a risk, what we call risk characterization, which basically the risk--the risk numbers that you probably heard about, one in a million, one in ten thousand, those types of risks that we use to describe cancer risk, and we have other numbers we use to describe non-cancer risk.

As far as the different scenarios, I don't have any site specific things here, but if you want to, you could look in your--if you want to look in your proposed plan fact sheet on page nine and ten, you don't need to spend time with it now, but if you want to look at it later, that goes into a lot more detail as far as the risks that were calculated for the site, and I'll be glad to answer any specific questions you have, too, tonight,, but I'm just going to be pretty brief now.

But basically what we did for this site is we decided that--we looked at the current use of the site and, of course, it's an inactive site, so the current scenario that we have would be--would be someone trespassing on this site and getting incidental exposure to soil and surface water and sediment that way.

And then, for the future, we looked at someone potentially working on the site, it becoming an active facility again and someone working there and being exposed to those same media, as well as groundwater, thinking that a future facility could put a groundwater well in and then the future workers could drink that water while they're at work.

And then we also had to be protective, since there's a lot of residences near the site, we also looked at the potential that someone could live on the site in the future. And, of course, from a realistic standpoint, if someone was to live on the site, then the site would have to go through a lot of changes; you know, the ponds, the former ponds being filled in, and changes in grade and all that. So, certainly some changes would happen at the site if that happened. But what we assumed for the risk assessment, kind of a worse case, is if the site stays as it is and someone lived there and had regular exposure to the site.

And what we found when we looked at these different scenarios, as Sheri alluded to earlier, for the current scenario, where you just had someone trespassing on the site on an infrequent, but regular basis, the risk from that scenario was deemed by EPA to be acceptable; in other words, there wasn't any more than a ten to the minus six, or one in a million risk for cancer in point, and for the non-cancer causing chemicals, we didn't see any problem with the calculated exposure to any of those either.

Then we looked at the future scenarios where we had--let me just look specifics up here. But then we looked at the future scenarios where we would have someone working on the site, and then we had someone living on the site, potentially; and also, a construction worker, where that would give the person exposure to the subsurface soil where the other receptors wouldn't get that exposure. And for, both, the worker and the future resident, we did have an unacceptable risk, and that was based on primarily, if not totally, on potential consumption of the groundwater, thinking that a resident or a worker, in either case, they're going to be consuming, that groundwater every day, like, for 25 years for a worker and for 30 years for a resident, and that the levels of compounds, levels of volatile organics in that groundwater would cause them to have a risk that EPA deems to be unacceptable; that was greater than one in ten thousand, basically, is what we determined for that.

And also, the other chemical which gave an unacceptable risk for both of those scenarios was lead in the soil. There is some real high levels of lead in certain areas of the site, and if a person had regular exposure to that lead, both for a worker--

And what we do for lead is a little bit different. We have a way to assess lead--well, for the resident, where we look at potential blood lead levels, that's really what we're concerned about, and effects on central nervous system of lead to the young child, and for the resident, we determined, basically, that it's about 400 parts per million that a resident should not be exposed to, as far as somebody having lead right in their yard. Which, of course, is not the case at the site right now. That was just a hypothetical scenario.

And also, for the future worker, what we assume there is to get at a sensitive receptor. We look at a woman who's working on site who becomes pregnant and then they have exposure to the fetus while they're working at the site on a regular basis, again; you know, a five-day-a-week job for, you know, several months at least. And for both of those scenarios, the risks from lead were deemed to be unacceptable also, for a person that has regular exposure to, you know, the worst areas of the site where the high levels of lead are.

And from those scenarios, or, you know, from all that risk assessment work, then we came up with risk base levels to clean up to, which I guess Sheri is going to talk about now. You want to talk about those?

MS. PANABAKER: If you're done.

MR. KOPOREC: Yes, I am.

MS. PANABAKER: One other point that we look at in the risk assessment also is exposures and risks to ecological receptors, and we--the toxicity testing at the site for the contaminated sediments in the wetlands, and determined there was a risk to ecological receptors.

As Kevin was talking about the remedial, roles which are into cleanup numbers, those are determined based on Federal and State laws, as well as the risk assessment, and as he said, there was a risk to a future industrial worker from lead above 1150 to a worker who was exposed to those soils all day long.

The subsurface soil numbers were derived from protection of groundwater, what concentration could be in the soils that no longer leaches above the groundwater--excuse me, drinking water standards. And groundwater pretty much came from the drinking water regulations.

Table II, which is in your facts sheet and up here, the first half of it anyway, shows the groundwater and the protection of groundwater remedial goals. We used the future industrial scenario because there's 180,000 square foot building on the property and it's surrounded on two sides by wetlands, and also, when we had come back here earlier, when we were up here earlier a year or two ago, we had talked to residents who expressed a great interest in a facility coming back out there and starting up another company so they could, of course, get jobs and stuff.

Again, those are the cleanup numbers for surface soils and for--one other point I forgot; in the south wetlands, that--we did not use a future industrial or residential scenario, we were protecting the ecological receptors, since it is a wetlands, and this bottom part of the chart shows the numbers that EPA believes to be protective of the ecological receptors.

The figures that you saw earlier, two and three, showing the areas of soil contamination and groundwater contamination are the areas we believe need to be remediated and addressed based on those cleanup numbers.

Once EPA comes up with cleanup numbers, we then look at different ways to address the various soil and groundwater contamination, and when we come up with them, we compare them to nine criteria. The first two of the criteria are called threshold criteria, and it's overall protection of human health in the environment and compliance with applicable or relevant and appropriate requirements. These are other Federal and State laws.

For an alternative to be considered in the feasibility study report, they have to meet these first two threshold criteria. Now, there are two exceptions that we usually have in our reports. One is called no action, and which the site would be left as is and nothing done, and this is required to be in our reports as a baseline, serve as a baseline for comparing the other alternatives to. And the other one we usually have is one called--well, it's up here as limited action, but it's insufficient controls where we would put a fence and signs up and a notation on the deed to let future owners know that there is contamination already on the site. But neither of them would involve a cleanup of any sort.

The next two criteria are called primary balancing criteria, and once alternatives meet the first two, they're compared against each other with these other five. They are long-term effectiveness and permanence, reduction in the toxicity mobility and volume of the contaminants through treatment, short-term effectiveness, which is what's the short-term risk to nearby residents, et cetera, and workers while implementing the alternative.

The next one is how insurmountable it is; is it easy to do, is it going to be difficult, are there things at this site that would make one alternative harder than another. And the other one we look at, of course, is cost. After that, we look at what's called the modifying criteria, and these are State and community acceptances of the alternatives.

Explaining the no-action and limited action alternatives, we have nine soil alternatives that we've, looked at and three other groundwater. I'm going to go through the groundwaters first because they're a little bit shorter than the soil numbers.

And I'm going to start with alternative

number four; source removal with dewatering in the source area with extraction wells or trenches. During the removal of the contaminated source, if it's in the wetlands, we would be doing dewatering, but this alternative mainly would be where we place either extraction wells or trenches around the main source area, and that's south of the solid ponds number two and south of those four wastewater lagoons. This would be done by extracting the groundwater, treating it and discharging it either to a POTW or a--through an MPDS permit, or injection, re-injection back into the groundwater.

This would address the contaminated groundwater up in the source area; however, that part of the plume that had gotten--that would be beyond where these wells were would not be addressed by this alternative.

The next one I'm going to look at is alternative five where we would do a source removal again and there would be dewatering in the area while we did the source removal, but the extraction wells would be placed along the periphery of the plume near the property line, and this would allow all the contaminated groundwater to migrate to these plumes where they would be extracted and treated as described earlier. It would probably take longer than other alternatives because the groundwater plume would have to migrate down to the edge of the property line.

And the last alternative would be number three that I'm going to describe. It's got a nice long title; source removal in which there would be a temporary groundwater extraction system that would be used for dewatering the area that will have the source removed out of it, but it would also then run for an additional four to six months afterwards while there was an evaluation period.

During this evaluation period, we would gather more information on the aquifer and figure out what the best treatment technology would be to remediate the groundwater, such as either pump and treat, like described earlier, or recirculation wells, which are a well that extracts water from one part of it, treats it and discharges it from another part of the well. Or air sparging, which would bubble air through the water to get the volatile organics out of the water.

Also during this evaluation period, we would look at natural attenuation to determine if it's being effective at the site in a similar time frame. And if so, then we may use natural attenuation for those appropriate portions of the plume.

The costs are at the bottom. Four is

running 3.8 to 4.7 million, and the alternative five is 4.6 million, and alternative three would be 2.4 to 5 million, depending on how much of the plume would be naturally attenuated, or which alternative, or human technology we'd look at.

The next thing I would like to talk about is the soil. We have seven alternatives described. Three of them, alternative three, three-A and three-B are containment alternatives. Three would involve leaving some of the material in place near the groundwater, capping it and preventing any further infiltration of groundwater to it. The mixed--that would primarily be metal soils. The mixed volatile organics and metals would also be excavated, mixed with quick lime, placed on the ground with a cap on top of it. Quick lime is a dewatering agent.

Three-A would involve excavating all of the contaminated soils, including what is called RCRA hazardous waste. RCRA is the part of EPA that regulates active facilities, and they determine some--for them, some of the soil would be considered hazardous and some of it would be considered not hazardous, and this is done by doing a leach test where you crush the material, run an acid through it, get the liquid at the bottom and test it, and if it's above a certain number, it's considered hazardous by RCRA.

And alternative three-A, even though this material may be considered hazardous by RCRA, it would remain on site, be mixed with quick lime, placed in a containment system with a bottom liner and a leak-check collection system and a cap.

And the third, three-B, would involve excavating all the material again, but the RCRA hazardous stuff would be taken off site to a hazardous waste facility, and the remaining material would be mixed with the quick lime and placed in a Subtitle D landfill.

Those--the cost of those vary between seven for three-A, or three, to about nine for three-A and eleven for three-B.

The next alternatives are treatment alternatives, except for the last one. Alternative four is solidification stabilization in which the material is excavated and solidified with a reagent that would prevent the materials and contaminations from leaching out of the soils above drinking water standards, or MCLs again.

The reagent mixture that would be used would be determined during design and would be whatever one was the most effective in preventing leaching above MCLs. That can run anywhere between 10 and 20 million dollars, depending on if we do it in situ or mix the material in the ground, or whether we do it ex situ and stick it in a pug mill and then mix it with the solidification reagents and place it back on the ground.

Alternative five is an innovative technology; it's in situ treatment for the volatile organic soils. It hasn't been used in a lot of sites, it's still relatively new. We're not 100 percent sure how well it would work at this particular site, and we would have difficulties due to the fact that a lot of the soils are saturated. Once the volatiles, however, were treated, we would either contain them or solidify them.

Alternative six is thermal desorption. It involves excavating the soils and placing it in the thermal desorber which heats the soils and separates organics and contamination from the soils, concentrates it and, most of the time, the concentrated material is taken off site. What would be left would be metals contaminated soils, which could then either be contained or solidified.

The last alternative doesn't involve treatment at the site. It would be excavating all the material that exceeds cleanup numbers and taking it off site to a hazardous waste facility, some of which solidified the material before they placed it in their facility, landfills. Alternative five runs between 10 and 15 million; alternative six is anywhere between about 19 to 47 million. It could be--it would also be difficult to implement six because of the saturated soils. And alternative seven runs around 11.8 million.

After EPA looked at all these different alternatives, we felt that each of these alone may not be the best cost effective best remedy, and we felt like a combination of three-B and four would be the most effective. The way this would work is all the soils would be excavated and they would be solidified. If they could not be--if they still were above the RCRA hazardous waste level, they would be taken off site. So the most contaminated soils would go off site. If they could be solidified so that they no longer reached above drinking water standards, then they would be placed in the ground with an engineered cap on top. And if they were still solidified and still leaching above MCLs, but below the RCRA hazardous levels, they could be placed on site in a Subtitle D landfill.

Solidifying the metals is usually not difficult and it's been done on many, many sites. The volatiles are the material that we're concerned about, and we're really concerned because the groundwater at the site is about two to three feet below land surface, so there's no room for attenuation as much as in other sites where maybe the groundwater is 30 feet below land surface.

And groundwater alternative number three, source removal of the temporary groundwater extraction for dewatering for the evaluation period, then picking of the best treatment technology out there and using natural attenuation, if applicabie, is the alternative that EPA feels is the best for the groundwater.

The State has concurred with the remedies selected; however, they disagree with the lead cleanup number for industrial use. They have a number of 895, whereas EPA's number is 1150; however, we believe that, by the time we excavate the contaminated soil out there, this number only applied from zero to one foot of soil, that both numbers--that the contamination that would be left behind would be way below both of these numbers.

We have assumed at this time that the future industrial use is the future land use for this site; however, we would like to hear comments from the public on whether or not they feel that that is the most appropriate future land use.

That's the end of my presentation.

MS. PEURIFOY: Well, with that, I think we're going to go through the questions and answers. I do have some things to tell you about what happens next, but I think we'll do that first and then I'll talk about those.

Questions? Comments? And please identify yourself when you speak.

BILL GRIFFIN: My name is Bill Griffin; I'm the County administrator. County Council met last Tuesday and we tried to postpone this; as you know, I made contact with you. And the reason that we tried to postpone it was because of the holiday season and the public involvement. So please don't consider this the public concern with the small crowd here. That's why we requested additional time.

Barnwell County has, in the past, been involved in cleanup efforts, and that's still costing Barnwell County. It cost us in excess of a million dollars, and costs us monthly also. We realize that EPA's involvement is to clean up the site to acceptable standards.

One of our problems are what are we going to do with the site afterwards. What I'm envisioning right now is a chain link fence, a condemned building and no future land use. I do not believe, nor does the majority of Council, that this is a viable industrial area, especially since it's right next to a residential area. So those are our concerns.

I did meet this afternoon with representatives from Textron and we've started discussing future land use of that site. I realize this is two separate issues per EPA, but it is a very big concern to the citizens of Barnwell County. What are we going to do with that property afterwards? And if all we're going to have is a condemned site, I don't think that's fair to the citizens of Barnwell County. Also, our concern is what future liabilities or contaminations is there at that site to our citizens here in the County.

So these are the concerns of Barnwell, Barnwell County Council, and I would like to reserve that 30-day extension so that we can get more public participation and we can address these other issues, and then leave us time so that we can discuss with Textron what we're going to do with the rest of the property. Right now, it seems like it's a very healthy dialogue with Textron, and I welcome input from them, and I think that we can come to an acceptable plan for Barnwell, Textron and EPA.

Thank you.

MS. PANABAKER: I do need to make one more point I sort of forgot. In this alternative that was preferred, we also have in there that if it's more cost effective to remove the material off site and off site dispose it, we may do that instead of the solidification at the Subtitle D landfill.

MS. PEURIFOY: Any other comments?

TIM MOORE: Has there been any determination on the cost effectiveness on those two alternatives?

MS. PANABAKER: We have looked at both costs and we are--you know, the solidification and then Subtitle D landfill, we think will run between 11 and 15 million. Off site disposal might run around 12-million, but the question is we don't know--we have an approximation of the volume and we have an approximation of the types of contamination, but you really don't know that, as well, until you've dug it up and done some things to really determine how much is going to be volatile organic soils and mixed with metals versus how much is really just metal soil. Solidification of metals is a lot easier than mixing it with the volatiles and the metals. So that would be more determined during the actual remedial design or remedial action phase because of volume difficulties in determining those numbers.

TIM MOORE: It would seem that if the costs are relatively the same that, considering the location of the site, in a residential area, that it would be, with that much difference, much better to move it somewhere else to a landfill rather than put a landfill right in the middle of town. That would kind of preclude any other activity and use of the site. Assuming if it were out in the country somewhere, maybe that would be the thing to do, to bury it right there, but right where it is, it doesn't seem to be the thing to do.

MR. JAN ROGERS: One of the--yeah, on the surface, that sounds true and that certainly would be considered, but one of the problems with taking it off site is because of the nature of how the Superfund works. Taking it off site somewhere, if it becomes a problem, where you take it creates additional liability, possibly to the tune of, you know, significant negotiation, litigation and other things if it went to a commercial hazardous waste disposal facility. It's not just the cost of dealing with it, but the factoring of who's going to deal with what portion of it.

And that tends to be a problem in all Superfund cleanups that gets overlooked. There is a potential failure off site that could result in additional liability back for the same waste. And legitimately so. The people spending the money worry about that concern even to the extent the Superfund, in some parts of the legislation, encourages treating and dealing with disposal of the material on the site so you don't move it to somebody else's backyard.

But it becomes a fine balance in trying to balance out what's the most appropriate for any given site. That's what we've tried to do here, but we've structured this in such a way that there are alternatives as we do the design, as we get a better feel for the treatability of the material. We've encouraged aggressive treatment for the volatile organics to get them out of the matrix. If it becomes more of a metals matrix only, metals and soil, that's a pretty well-known matrix for dealing with treatment and dependability of the effects of treatment.

And then it also becomes an issue at that time; what are the costs of the disposal for that material if it leaches above MCLs. We feel like it's still groundwater if the leach agent after treatment gets above MCLs, but if it's below criteria for hazardous waste, welve said Subtitle D facility, which is the kind of facility typically used to control that kind of waste on site. We haven't precluded going off site to a similar type facility, if that makes more sense. And in part because of the shallow groundwater.

TIM MOORE: If you did put it there, what percentage or what portion of the site would be used for landfill? Would there be something left over to be used for something else?

MS. PANABAKER: Yes. We're looking at the fact the four wastewater lagoons is the area, and then right the other side of the building, so it'd be behind the building. You still have areas out in front of the building, near the parking lot and that area, that has not been used that could be turned and used into something else.

MR. ROGERS: There was a conceptual drawing done to estimate where the estimated volumes could be put or placed and that was perceived to be doable around the side and possibly even behind the building, but basically out of the usable part of the property.

MS. PANABAKER: The areas we're looking at are back in this area and then back in here.

DOUG KROGH: How much surface soil would have to be removed over the entire area in order to get down below the contaminant lines?

MS. PANABAKER: The total estimated volume to date, which includes subsurface soils, is around 40,000 [inaudible].

DOUG KROGH: Can you give us a perspective in depth?

MS. PANABAKER: The upper part is about one foot of surface soils. The four wastewater lagoons are probably about two feet and to the bottom of them. The solid pond, one is probably about eight feet or so; ten feet. The solid pond is probably something similar. And the others out in that wetlands area are probably, at the most, five feet, but a lot of that would be one foot also. Everything in the wetlands, that would be one foot or so unless it's vol? organics, and then it might be three or four feet in some places.

DREW WILDER: Is it EPA's position that you want to keep this an industrial site, and so that's the only use you see for this property in the future, is an industrial as opposed to residential, or playground, or anything like this; correct?

MR. ROGERS: We don't have a preference for where it goes, but by law, we're required to clean it up to a reasonable expectation of future use. And I guess, you know, there's certainly been a lot of discussion both ways as to what--what would be best suited for the public isn't necessarily the criteria; what would be the most logical use, future use, because someone is being held responsible for paying for the cleanup, regardless of who does it. Whether the responsible parties do it up front, or whether the Federal Government cleans it up, we will pursue cost recovery of any money we would spend. And the law says clean it up to a reasonable future use.

A lot of that hinges on the issue of

there's a building there. We went back and actually looked at the building. The building is in a deteriorating condition, but it's not falling to the ground. It's a usable capital investment if somebody chose to want to go in there and use it. And this is, to some extent, crystal ball. It's anybody's, you know, opinion of what future use could be. But while that building is there, it suggests a strong tendency toward a commercial use of the property, and we don't see a particular reason to, as part of cleanup, knock the building down and take it away. It's not necessary to get to the contamination or deal with the contamination, and the funds that we would access, or the law that suggests cleaning up the site, deals with cleaning up the contamination problem, not necessarily improving the useability of the property.

So it's sort of forced us to say the realistic future use remains probably commercial as long as that building is there. We're not saying it can't go some other route, and we wouldn't want to preclude it going that route, we would just want to make sure people realize, if you're going to convert it to another use, there may be some additional concerns in dealing with that.

But again, most of this contamination is over behind the building, out of the way, and that's a fairly large parcel of property such that this cleanup could still take place and possible other uses be implemented, even if some material were left on site.

EDWARD LEMON: Has the building-- underneath the building been tested, the ground underneath the building?

MR. ROGERS: Not directly under it. There was some testing around it.

MS. PANABAKER: There was testing around the building and we did not find anything in that area around the building.

EDWARD LEMON: Could it not be contaminants under the building without it leaching out underneath there? I mean, is there a possibility of that or not?

MR. ROGERS: Minimal. We looked around the building edge and basically found--the majority of the contamination was out on the surface soils, away from the building, or right behind the building where there appeared to be some burial or some dunking, or both. But there's nothing to suggest significant contamination under the building. If there was anything significant, certainly, it would be migrating because of the shallow groundwater.

HAROLD BUCKMON: Ladies and gentlemen, my name is Harold Buckmon and I'm the chairman of Barnwell County

Council. Let me speak on behalf of what the Council would like to have done.

Being a lifelong resident of this particular County, I played in that particular area where that particular plant is right now, fished in those little lagoons, as they call them.

I see very serious problems that we have, and first of all, the building has no industrial type use for us right now whatsoever. The cost would just be too astronomical to repair. You don't know what the contaminants are up under that building.

We vision a residential type area in the future. That is ours and we know that we have to work with people. Let there be no misunderstanding that we want it as clean as possible; as clean as possible for the simple reason that's the way it was when they came here, and we don't want it left here and for future generations to deal with. We're dealing with an unknown. Yes, we say the probability of one in a million, but who is that one in a million? We have to look at the thing futuristic. Simply put, we don't want it, we don't need it. We want to work with anybody or whoever, but we just now--we just don't need that type of thing as a legacy for our generation to come.

Again, we're going to be working with

people in any way that we can, but let there be no misunderstanding, we don't want it and we don't need it. And with that, I'm going to get supper.

STEPHEN GUILFOYLE: Has there been any ruling on who's responsible for the contamination and financially responsible for cleaning it up?

MS. PANABAKER: We're in the middle of a research to determine who all the potentially responsible parties are.

DREW WILDER: Can one assume that one of the responsible parties would not be the City or County of Barnwell?

MS. PANABAKER: Well, our next step, which she'll go into a little bit, is that we will negotiate with the company PRPs for consent decree for them to do the cleanup of the work. Or, as always, EPA will do it if we don't have anybody willing to do the work.

MR. ROGERS: But even more to that question, I don't believe we see the City or County being identified as--we always call them potentially responsible parties, because no court has decided that, but we don't view that---I don't think we know of any information that we would view it that way.

DREW WILDER: You see Textron and Shuron, Inc.?

MR. ROGERS: They're the two primary ones that were identified early on. We're going to--we always re-visit the responsible party search before we go into negotiations after making the remedy decision to make sure that we have all the parties that appropriately should be identified at the table. But, yes, those are the two that have been--

DREW WILDER: One of those being bankrupt now.

MR. ROGERS: Yes.

DREW WILDER: But Textron is a viable company and they have accepted some responsibility by paying for the remedial study; correct?

MR. ROGERS: Yes. They've cooperated up front and participated in the investigation, the remedial investigation and feasibility study to date.

STEPHEN GUILFOYLE: In your proposal, too, you also said that there is no action, that you'd usually base it on comparison, and there's a price tag for that [inaudible].

MS. PANABAKER: That was for surface water, and--and one of them had, I think, something. That was surface water and groundwater monitoring.

DOUG KROGH: If the option was taken that we remove the material, the contaminated material, from the site and put it to a different site, would Barnwell County at that point become one of the entities that are liable?

MS. PANABAKER: If we took it off site to a hazardous waste facility?

DOUGH KROGH: Yeah, if you took it to another facility, or another burial ground. He had mentioned before that the liability concern about removing it after it's brought out of the site and put somewhere else is not necessarily disappeared, and I just wondered does Barnwell County, in itself, keep that liability if it is removed from here, or we have nothing to do with it?

MR. ROGERS: The law speaks to owners, transporters and operators that dealt with the generation and disposal of the waste. So, thus far, Barnwell County has not been involved in that aspect of it, to our knowledge.

If the remedy calls for it to be placed off site, it would be taken to what was considered to be an appropriate facility for that material and it would only create liability to the people disposing of it off site and the people receiving it. So, typically, the answer would be no unless the receiving facility were a Barnwell County facility, you know, something like that. But, no, the County really--there should be no way that the County is pulled into this from a liability perspective unless they were to take over the facility, run the facility, you know, numbers of things that really become more actively involved in dealing with waste and disposal of waste.

DOUG KROGH: I guess I would hope not because we have already--you know, as a taxpayer, we already put up the money for the Superfund, and if we get it from Barnwell County also, then we've got to pay for that, too; we're getting double-dipped.

MR. ROGERS: Well, very little money in the Superfund is taxpayer money. Most of that money is generated--in the trust fund that runs Superfund is a tax on industries that generates the kind of materials that ultimately became these kinds of waste. So the majority of the Superfund money is usually from people who deal with those chemicals, manufacturing and distribution of those chemicals. And, to a great extent, the program is run in such a way now that we have the responsible parties do a lot of the work up front, so our daily cost of running the program, we take off the fund, and then we recover them and are reimbursed for them along the way. So most of this is paid by the industry that created the problem. That's the way the law is set up.

STEPHEN GUILFOYLE: How much has been spent on the site so far?

MR. ROGERS: We really don't know the numbers because we're not paying for the work, we're just overseeing the work to make sure it's done properly. That's something that the responsible parties can tell you. You know, we can tell you what we've spent, but most of our money is basically just our resources; our staff and our time in dealing with overseeing and reviewing everything that's been done.

MS. PEURIFOY: Any more questions or comments?

DREW WILDER: Are you going to take us now to where we go from here, I guess?

MS. PEURIFOY: Yeah, I guess it's about that time.

Where do we go from here? First of all, we've made a commitment to come back up and have another hearing as you work out your plans for future use, so we will be coming back up, I'm thinking probably sometime mid to late January. The comment period will be ending February 4th. So we'll be working to set that up and everyone will be notified of that. We'll get it back in the paper again. We'll also be putting a notice in the paper that the comment period has been extended.

Again, if you're not on our mailing list, you didn't get a fact sheet in the mail from us, I encourage you to fill out the addition to the mailing list slip that's in the back of the fact sheet and give it to me tonight so that you will start receiving mail directly from EPA on what we're doing and what's going on with this site.

Once the comment period ends, we will consider all the comments received, and what Sheri will have to do is prepare what we call a responsiveness summary, and that's a document in which all comments received during the comment period are responded to. That document becomes a part of what we call the record of decision, which is the document that says what the final decision is for a cleanup of the site. That information will be made available to you. We'll send out notices letting you know what the record of decision says, what has been selected as a final remedy for this site. That will also be published in the paper.

After all that's done, then we go into what was just discussed before, into negotiation period to get the potentially responsible parties on board to sign an agreement with us to do the work that's carried out in the record of decision. And we, again, will also make you aware of that; what's going on there, when this agreement is signed. And all that, again, will be made a part of the information repository at the library. All those documents will be put there when they're finalized. And we will go on from there into designing the cleanup and you'll be kept informed of all that as well.

So that's pretty much it. We encourage you to call us, let us know if you have specific questions as you go through this proposed plan. If you see something there, we do have an 800 number that's in the fact sheet. Please call us any time and let us know if you have any concerns or questions or just need some additional information.

With that, I thank you again for coming out tonight, and we'll see you in January.

[PROCEEDING CONCLUDED AT 8:00 P.M.]

C E R T I F I C A T E

S O U T H C A R O L I N A

BARNWELL COUNTY

I hereby certify that the foregoing Public Hearing was reported, as stated in the caption, by the method of Stenomask with backup and reduced to typewriting by me or under my direction; that the foregoing pages 1 through 41 represent a true, correct, and complete transcript of the proceeding held on the 9th day of December, 1997.

This 12th day of December 1997.

<IMG SRC 98086P>

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SHURON SUPERFUND SITE PROPOSED PLAN MEETING

before Alice D. Boni, Court Reporter

held at the Barnwell County Council Chambers

Barnwell, South Carolina

on Thursday the 22nd day of January 1998

commencing at 7:10 p.m.

- - - -

APPEARANCES

FOR THE EPA:	Sheri Panabaker Jan Rogers
FOR S.C. DHEC:	Gary Stewart Kent Coleman Enayet Ullah Yanqing Mo Darrell Weston
FOR U.S. AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY:	Eric Melaro

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MS. PANABAKER: My name is Sheri Panabaker and I'm from EPA in Atlanta, Georgia. I'm the project manager for the site. With me tonight is Jan Rogers, who is the South Carolina section chief, also EPA.

There are a number of people here from the State, and if I forget one, somebody yell. We have Gary Stewart and we have Darrell Weston, Kent Coleman, Yanqing Mo, Eric Melaro and Enayet Ullah, also with the State.

We're in the middle of our 60-day comment period that started December 5th and will end February 4th. We've been here two other times and we were requested to come back again, so we're here for the third time. We have an administrative record that contains all the information about the site. One is located at the Barnwell Library and the other one is located in Atlanta, Georgia.

There's many steps in the Superfund process. We've been through the first four and we're currently in the fifth part where it's public comment. The site was ranked. The remedial investigation actually started prior to the site being ranked. That was done in '95 and '96, and the feasibility study finished up in '97. And as I said, we're currently in the public comment period. After the end of the public comment period, the next steps are to make a decision on how to clean up the site, which will be written up in a record of decision, followed by designing how to clean it up and actually implementing the clean-up plan.

As I said, we did the remedial investigation in 1995 and 1996, and we collected soil and groundwater samples. Soil samples would be anything; surface soils zero to one foot, subsurface and sediment. When I say soil, I'm talking all those.

What we found during the R.I. was that there was about seven or eight organics and four metals detected in the soils. And those are the areas that we believe need to be addressed based on our soil sampling.

After we collect the samples, we do what's called a risk assessment. What we determine, if there's any current or future risks to nearby residences, or if it was an active facility, on-site workers or whatever. Since it's not an active facility, the current scenario that we evaluated was a trespasser and we determined that there was not a current risk to a trespasser.

There was, however, determined to be a future risk for either a worker or a resident if they built a house on the property, so we had to come up with different alternatives on how to address soils and groundwaters because of the potential future risk.

And we also put monitoring wells in the ground and collected groundwater samples and found the same seven or eight organics, as well as some lead, and that's approximately where the groundwater plume is currently. This will all be further determined and verified during the cleanup portion of the project, which will be the designing and actual remedial action phases.

So once we determined what one contaminants were and the areas that needed to be remediated, we came up with different and various alternatives. I'm going to start--oh, quickly, in your fact sheet, it shows--once we come up with the contaminants in the areas, we also come up, of course, with what we need to clean them up to. These are the groundwater remedial goals. For the most part, they comply with the State and Federal standards drinking water regulations, and their drinking water levels.

The soil numbers primarily came from either protection of the ecological receptors out in the wetlands, at the bottom, or for surface soil for protection of the future industrial worker. Since there's a building on the site that we feel could be reused, or opened for something else, we picked industrial cleanup standards, and we have 1150 for lead and, as you can see, the rest of them.

We had 14 alternatives, total; we had five groundwater and nine soil. For both soils and groundwater, they all have a no-action alternative that you could do, which serves as a baseline to compare the other alternatives to. A no-action alternative is that we would not do anything at the site, would not clean it up, just leave it as is.

The second alternative that is also for groundwater and soils, which are included in most of our feasibility study reports, is called--well, here, it's called limited action, but it's institutional controls; it's like putting a fence up with deed restriction to prevent people from drinking water; signs that tell people there's contaminated soil in here.

Besides those two alternatives, there's three other groundwater alternatives we looked at. Number three--all the soil alternatives, there will be a source removal, since a lot of the contaminated soil is in the wetlands. There will have to be dewatering to excavate the soils. So, for alternatives three, four and five, they all have this dewatering period, but for alternative three, it's going to extent four to six months past when the soil is excavated. This will give us a chance to have an evaluation period to determine what the best treatment technology is for remediated groundwater, whether it could be air sparging, which would be bubbling air through the water and it releases the volatile organics, or pump and treat, where you would extract the groundwater and then put it in a treatment plant, treat it and discharge it. And the third one was recirculation wells, which are wells that extract water from one part of it, treat it, and discharge it out of another part of that same well.

We'd also be evaluating natural attenuation to see if it's occurring at the site and if it's occurring at a similar time frame as an active treatment. And if it would, then that could be applied to those appropriate parts of the plume.

Alternative four, again, would have the source removal and dewatering just for the period of the source removal, and then extraction wells or trenches will be placed in the highest contaminated groundwater area, around the source area, and the groundwater be extracted and treated and discharged. It's not going to treat what's already past where that trench would be, or the wells, it would treat the very heavily contaminated groundwater.

Alternative five would be putting extraction wells, or trenches, but probably wells down by the property boundary where the edge of the plume is, and it would intersect all of the contaminated groundwater coming towards it. It would just take a little longer than possibly other alternatives.

After that, we looked at soil alternatives. Again, the no-action and an institution of controls. Alternatives three, three-A and three-B are all containment alternatives. Three would be where most of the soil was excavated, but some of the metals on this soil would be capped in place. The rest of it would be excavated, mixed with quick lime, because a lot of the soils are very wet, especially the ones coming out of the wetlands, and so they would need to be mixed with a drying agent, such as quick lime. And then they would be placed in the ground and a cap placed over them. One other thing that you need to know is that the groundwater is, like, two feet below land surface around the site.

Alternative three-A would be that all soils were excavated, including the metal soils, and they would also be mixed with quick lime, and they would be put in a containment system where they would have a liner on the bottom, a leak-check collection system, and a cap on top. But this would include all soils, including what's considered RCRA hazardous waste.

RCRA defines some waste as hazardous and some waste as not hazardous, based on a leaching test where they take soil, pour an acid through it, collect the liquid underneath and analyze it. If the amount of contamination in that liquid is higher than a certain number, then the soil is considered hazardous.

Under alternative three, the RCRA hazardous waste would also be put in a containment cell, which is not a full Subtitle D landfill, which is a little stricter than what alternative envisioned in it. RCRA doesn't allow hazardous waste to go into Subtitle D landfills. They want something a little more stringent than that.

Three-B, therefore, has, as part of its remedy, that the hazardous waste will be taken off-site. So the highest contaminated soils would be removed from the site and the lower contaminated soils would remain on site in a Subtitle D landfill, which RCRA would normally allow.

The fourth alternative is solidification stabilization in which a reagent is mixed with the contaminated soil so that the material, when it's finished being mixed and cures, would not leach above drinking water standards. Usually, a lot of times, cement is used, but there's other reagent mixtures out there that have been proven successful on other sites.

Number five is called in situ thermal treatment. That's for the volatile organics only. It doesn't do anything for the metals. So, what that involves is placing electrodes in the ground, heating the soil, which would release the volatile organics, and then the metal soils, which would be left, would either be solidified, like in alternative four, or it would be contained like alternative three-B.

Number six was thermal desorption with, again, containment and solidification because thermal desorption also only works on volatile organics. And that's a process where you heat the soils, which causes the volatile organics to separate from the soil, and then they are concentrated. And that's usually taken off site. Then you would be left with metal soils that are either solidified or contained, like in alternative three-B. And number seven would be taking all the contaminated soil off site.

Our regulations prefer that we treat the soil on site, which is why we have all these on site various choices. What EPA picked is what they believe is the best alternative for groundwater, was alternative three, which gives us the dewatering scenario for four to six months after the source removal so that we can have the evaluation period and evaluate the best treatment technology and to also evaluate natural attenuation.

Our estimate right now is somewhere between two and a half and five million dollars for that alternative, based on which treatment technology turns out to be the-most effective and how much could be naturally attenuated with the plume, et cetera.

The best alternative, we felt, for the soils was a combination of alternatives three-B and four. The soil that were contaminated above the remedial goals, which is on table two in your fact sheet, all of it would be excavated. It would be solidified and aerated to treat the volatiles and the metals. If, after treatment, or if we knew it because it was so high we knew treatment couldn't handle it, we would take--and it was, therefore, above RCRA hazardous levels, that material would be taken off site. If we treated it with solidification and aeration and it was no longer leaching above drinking water standards, we'd place it on the ground with an engineered cap on top.

If it was still leaching above drinking water standards, but below what's considered RCRA hazardous, we would place that into a Subtitle D landfill. And that, we've estimated--I don't have that sheet up there, but it's somewhere between 11 and 15 million, is our guess right now.

Anyway, that's my whole presentation, so if y'all have questions, feel free.

MR. FLOWE TREXLER: Ma'am, is the building contaminated also?

MS. PANABAKER: The building had a removal--I'm sorry, I should have mentioned it. There was a removal done inside the building in 1994 in which the hazardous drums that had been left there by Shuron, Inc. were removed, so--and all the property, I think, when they went bankrupt, they sold all the stuff in there. All that's left is the building, itself.

MR. FLOWE TREXLER: And is it safe?

MS. PANABAKER: Is there contamination still left in there?

MR. FLOWE TREXLER: Yes.

MS. PANABAKER: As far as I know, there's not. Removal took care of what was left in there.

MR. FLOWE TREXLER: Now, they had trenches in that building. Has anybody checked them? Underground trenches?

MS. PANABAKER: I know there was a wastewater treatment plant that discharged out into the wastewater lagoons. Don't know if I know of anything else.

MR. JAN ROGERS: Trenches or basins?

MR. FLOWE TREXLER: I think it was trenches. I don't think there was a basin, I think there was trenches, and I don't--I could walk in them. They were big enough to walk through. And I believe they led to the lagoons, I think.

MS. PANABAKER: There was piping to the lagoons.

MR. FLOWE TREXLER: Well, then, maybe the piping was in those trenches.

MS. PANABAKER: I don't know about any trenches. We did investigate the soil around the building and we investigated the soil in the four wastewater lagoons.

MR. FLOWE TREXLER: Well, the last time I rode by there, there was still water barrels in the back yard, the back dock. Are they still there?

MS. PANABAKER: I guess so. I see a nodding head over here from a State person.

[Inaudible conversation form State personnel]

UNIDENTIFIED STATE PERSON: You put it in the barrel and then they test it to see whether it's bad or not.

MR. FLOWE TREXLER: But eventually, those barrels will disappear?

UNIDENTIFIED STATE PERSON: Yes.

MR. JAN ROGERS: Yeah. Basically, it's called investigation derived waste, and typically it's just accumulated on site. It's not necessarily real high concentration or a real problem, it's just a matter of typically you want to dispose of it when it's a convenient time to dispose of it for handling purposes and other reasons.

MR. FLOWE TREXLER: Now, forgive me for asking these questions, but I'm just curious. If you took that soil out and disposed of it, completely made it disappear, are you going to put some more soil back in the place of it, or are you going to leave it fenced, or lagoons? What will you do?

MS. PANABAKER: What's anticipated is we would excavate the wastewater lagoons, the four wastewater lagoons, the two solid ponds, treat the material and put clean fill to get it three feet above the water table, and then put the solidified material back on the ground, or put it in a Subtitle D, which will be in that location. That's what's anticipated conceptionally right now.

MR. FLOWE TREXLER: I'm not sure I understood you. You're going to put fresh soil back in at what level of the water table?

MS. PANABAKER: To bring it three feet above the water table.

MR. FLOWE TREXLER: And then what are you going to put in above that?

MS. PANABAKER: Then we put either solidified material, if it doesn't leach above drinking water levels, which is like five parts per billion, those levels, and if it still does, then we'll put it inside a Subtitle D landfill which will be a bottom liner, a leach check collection system, and the solidified material would go on top in a cap.

MR. JAN ROGERS: Under some scenarios, some of the soil could remain on site, but typically, it would at least have a cover on it, or be disposed of more securely, depending an the leachability of the resultant material after treatment. And one of the areas that would have materials removed and dealt with is the old wastewater lagoons, so they'd become a convenient place to backfill material that's treated. But we wouldn't do it in the groundwater, we would raise the level up out of--above the high water mark of the typical groundwater, and then backfill.

MR. FLOWE TREXLER: And you do that with fresh good soil?

MR. JAN ROGERS: Yeah. I mean, you could get other--you know, background soil on site or some other source of soil, but you would, in essence, get it up away from the groundwater, then come back and build whatever is appropriate for placement of the soil and then any of the soil left on site would have a cover put on it, whether it was just earthen cover or a more sophisticated cover. We typically wouldn't leave big holes.

MR. FLOWE TREXLER: Okay, now, that stuff you left mounded up, would that be safe?

MR. JAN ROGERS: Wouldn't--well, we--oh, yeah, okay, in some cases, it could actually come above ground level.

MR. FLOWE TREXLER: See, I envision that one good use for this property would be playgrounds. It's something we need desperately in Barnwell. And if you did that, you wouldn't want to mound the dirt there, you'd want it to be fairly level.

MR. JAN ROGERS: Well, you wouldn't necessarily put the playground on top of it, but the design would be oriented toward putting it in a portion of the property where you really wouldn't necessarily need to use that property anyway, and keep the rest of the recreational activity away from there on the rest of the property. That's--you know, I know some of the side discussions going on between some of the local authorities, and that may or may not come about.

We're having to look at it right now as a site with a plant building on it that has reasonable integrity such that we can't really go off and say, "Knock it down." I mean, it's expensive to knock it down and it's not really a contamination problem at this point. But it tends to lead us to look at future use scenarios for cleanup purposes of industrial because, in fact, it could be used for industrial, and more likely would be used for industrial if the building stays there. If the building goes away and it goes residential, certainly the conversion to that could occur in such a way that it could be done safely; not residential, but playground or recreational.

MR. FLOWE TREXLER: Well, playground and residential is virtually the same specs, I think.

MR. JAN ROGERS: Yeah. From our perspective, it changes a little because of how we calculate risk assessments. We, in essence, try to figure out what is the likely exposure mechanism that occurs with the activity that occurs. Recreational is a little different than residential with a young child playing in the background every afternoon, that sort of thing. So it changes exposure scenarios. But yeah, the degree of cleanup ends up being roughly the same.

MR. W.A. GRIPP: Is this the question and answer or public comment?

MS. PANABAKER: It's both.

MR. JAN ROGERS: It's both.

MS. PANABAKER: It'll be included on the record. All of this is in there.

MR. JAN ROGERS: All of this is official public comment, but it's question and answer.

MR. N.A. GRIPP: Well, I'd just like to address everybody that the decisions made by EPA and from the citizens of Barnwell County are extremely important, but the EPA goes back to what Textron does, or fails to do, and it definitely impacts Barnwell County. The last meeting, I reported that I was in negotiations with Textron. Unfortunately, that did not pan out. In fact, we just received our offer the day before yesterday, and were speaking again this afternoon, and it just did not pan out.

But I'd just like to say a couple of things on Textron and what we're looking here so that everybody is aware of what's going on. One, Textron comes to our County and builds a plant and employs people. We welcome any industry in Barnwell County that is a corporate citizen and contributes to the County; we welcome that. We welcome the jobs and the growth.

But I'm going to paint a little bit different picture right now because I want to tell you something that I have learned and I have researched. One, there is a letter that was written to Textron from a law firm in New York. I've been trying to find this letter. And apparently, this letter is stated as, "Divest yourself of these properties because of these environmental issues." So, we're not talking this corporate citizen that--and poor old Textron here.

Many of the contaminants and a million dollars of cleanup at our landfill was done, and who paid for that? Barnwell County paid for that. What myself, as well as others in this County, don't want to see is that piece of property that, I'm sorry, sir, I have to disagree with you as being used for industrial purposes for future use; I don't see that, nor do a lot of other people see that. But what we're going to look at is what is left behind is a building, a contaminated or quasi Subtitle D landfill that was probably known to be contaminated--or could have been; let me put it that way.

I've been in contact with a former County administration, Mr. Robert Bolin, today who tells me that that letter does exist. I've also been in contact with the former County attorney that is a resident here of Barnwell, and I've made contact today with an environmental attorney in Atlanta, Georgia who was covering that case.

The bottom line is, I believe, there's reason to believe that that site was contaminated before. Nobody stepped up from Textron to pay for the cleanup or participate in that cleanup at our landfill. I feel resistance to get that area clean. And I see Barnwell County citizens bearing the cost of future use of that property, and that's why I'm so adamant about getting that property clean.

I am requesting, not only from the County, but as a citizen of Barnwell, also; I would like to see that site to residential standards. Take the contaminants out of Barnwell, get them out of Barnwell County and remove it all. We have enough contaminants, we don't need another Subtitle D landfill, and we definitely don't need future costs and liabilities on that stuff.

MR. JAN ROGERS: To that end, the legislation is set up, to where there should not be any liabilities that extend to the County. There's basically no way for them to get out of the liabilities if there's property-- or there's material left on site, it, in essence, requires long-term, what we call, O&M, operation and maintenance monitoring, making sure the cap stays-- maintains, retains his integrity, and those kinds of issues. There's really no way, other than a legal faux pas down the road somewhere that it becomes a burden of the County.

Some of the issues you mentioned are theoretical issues that deal with the whole implementation of the Superfund legislation. The law was passed in an unusual way that has--it assigns retroactive liability to the people who generally were associated with causing the problem to deal with cleaning up the problem if it's considered to create an risk.

The disposals, the activities and those sorts of things weren't necessarily illegal or improper at the time. If they were, we have other ways of following through in enforcement actions on that. But a lot of these things occurred when there were no laws and regulations on what to do with this waste. So it becomes kind of a hypothetical issue of, yeah, Congress said you're going to hold anybody who owned it, operated it or transported the waste liable, retroactively, which is unusual in U.S. Code, for now taking care of making that site safe. It's not--well, and it's basically oriented toward looking at past disposals that are now, in today's time, viewed as inappropriate and unacceptable from human health or in ecological risk perspective, and making them right.

Now, the problem with hauling it all off, and the theoretical issue that has evolved over years of Superfund implementation, is most people would say, "Just pick it up and take it away from me." Well, when you take it away from you, it goes to somebody else's back yard, so to speak. And there's this not-in-my-back-yard syndrome that emerged whereby preference was sort of given toward dealing with the problem and dealing with it on site as much as possible because, if you do pick it up and move it, you basically are taking it to somebody else's area and dumping that problem on them. Now, that's very hypothetical.

MR. W.A. GRIPP: Right, but, sir, aren't there not landfills that can take that waste?

MR. JAN ROGERS: Sure.

MR. W.A. GRIPP: And designed for the disposal of that waste and the treatment of that leaching and those contaminants?

MR. JAN ROGERS: Yeah.

MR. W.A. GRIPP: So what I'm saying is--what I'm envisioning in my mind is that we're going to have that contaminated building, a rusted chain link fence with a lock on it, with a little mini Subtitle D landfill sitting over here that has no future use for Barnwell County, that we can't do anything with. And what I was proposing is doing something with that.

MR. JAN ROGERS: Removal of the waste won't change that. You'll still have a rusted dilapidated building with a rusted fence.

MR. W.A. GRIPP: Well, that's right, and that may be another legal issue.

MR. JAN ROGERS: Of course, we've given you some links to some other Federal programs that might actually be able to help deal with that issue.

MR. W.A. GRIPP: Such as Brown--

MR. JAN ROGERS: Well, not just Brown Fields, but HUD and some other redevelopment initiatives that might actually be able to help you, as a County, with that issue.

MR. W.A. GRIPP: And are those matching funds, or--

MR. JAN. ROGERS: Oh, I don't know, They're Federal programs and I just know that it might be a way for--I mean, this wouldn't be an unusual issue for any County. You have to have old abandoned buildings that are rundown and dilapidated and it, unfortunately, becomes the burden of the local community to deal with it, without the waste.

MR. W.A. GRIPP: Right. And that's what--we're trying to avoid that and incur any more burden or problem.

MR. JAN ROGERS: And, you know, the problem we have is the legislation doesn't allow us to go out and improve property. It basically tells us to deal with the contamination that exists and remove any health risks that may be associated with it for current use or future use, which is kind of a crystal ball thing.

MR. W.A. GRIPP: And these may be legal issues that surpass the EPA, what we're asking for.

MR. JAN ROGERS: Yeah, and we're not--I mean, we're not--

MR. W.A. GRIPP: But there's two different--

MR. JAN ROGERS: We don't disagree with the concept that the County would like to go with a recreational facility. How much we can drive that and how much the County has to drive that on its own is the issue.

MR. W.A. GRIPP: But then, on your part, the cleaner that site could be, sir, the far easier it would be for Barnwell County to develop it into some residential standard type facility, whether it be housing, recreational park, or whatever, but doing the minimum or the cheapest, or whatever, would not be advantageous to Barnwell County by leaving contaminants on the site.

MR. JAN ROGERS: The cheapest might actually be off site.

MR. W.A. GRIPP: Okay, well--and that may be the best--

MS. PANABAKER: And, well, remember that there's a twist to this alternative where, if it is more cost-effective to take it off site, that's still an option. It's not precluding--

MR. JAN ROGERS: We've structured this thing to where it gives preference for treatment in making it nonhazardous. It really doesn't give preference for leaving it on site, but it leaves the ability to leave some of it on site, but it also leaves the opening to take some of it off, especially if it were more economical. It doesn't make any sense to leave it on site if it were more economical. It's not necessarily an ill-fought remedy so much as there are still unknowns and variables that come into play that will occur two and three years from now, as the implementation takes place, that will dictate what is the most logical way to deal with it at that time.

MR. W.A. GRIPP: As for the water contaminants that have been found, that area, I do believe, is on water and sewer; however, that water, as it migrates, how can we be assured that that water will be drinkable for those standards to wells in the area?

MS. PANABAKER: Well, we have monitoring wells all over that site. And there is one between the plume and your nearest municipal well, as deep as your nearest municipal well. So it's going to show up there before it would ever show up in your well. Plus the direction of ground flow is you're not towards your well.

MR. W.A. GRIPP: Okay, so, it goes towards--

MS. PANABAKER: The wetlands.

MR. W.A. GRIPP: --Turkey Creek.

MR. JAN ROGERS: Yeah.

MR. W.A. GRIPP: Turkey Creek goes---

MS. PANABAKER: That's a long way to Turkey Creek.

MR. JAN ROGERS: The remedy is oriented--the goal of the remedy on groundwater is to restore it to usable standards, which are basically drinking water standards, or potentially surface water quality standards in the stream, which we don't really envision as probably being a problem; mostly drinking water.

We also envision a high degree of unlikeliness that it'll ever be used for drinking water because the path of the material is going through a swamp, or under a swamp, and a wetland and headed toward the creek. And the dynamics of discharge of groundwater to the creek basically will dilute it out, if it ever got that far, but the goal remains proactively going in there, recovering certainly as much of the high concentration of groundwater contamination as possible, and then--because you're going to have to dewater anyway to excavate the contaminated soil, some of it which is behind the building and fairly deep--not deep, but down in the groundwater.

And it seems appropriate to take a re-look after the dewatering and the excavation to see how much of the high concentration groundwater has been cleaned up, what is left, and what are some appropriate ways to deal with those residual parts. We know some concentration figures that are out toward, I guess, into the marsh, the wetlands.

MS. PANABAKER: Right near the south drainage ditch by the river beds.

MR. JAN ROGERS: But if it's a small finger of contamination, it's conceivable, one other way of dealing with it, and actually as efficiently as going in and putting wells and trying to recover it, would be to monitor it and make sure that it goes away either through--what we call natural attenuation is a combination of things. There could be biodegradation going on; not a lot, but there could be some. But there could be also some dissolution and dispersion going on which would bring it down below acceptable standards before it gets near any kind of receptor that could possibly use it. But that would all be a part of the groundwater remedy as it plays out.

And the reality of it is trying to take a crystal ball and say today, "This is exactly how this remedy should be implemented," is pretty difficult because the fact of the matter is it needs to be fine-tuned as it's implemented and revisited as to when are you spending good money to effectively remove waste from the environment versus when did you reach a point where you're throwing an awful lot of good money and not recovering much of anything from the environment.

Now, what the goal still is, ultimately, to get it cleaned up to usable standards, but there are a number of getting there, both proactively and otherwise. Of course, we're not proponents of dilution, but it is a reality of life.

MR. DOUG KROGH: Two issues that I'd like to bring out, one being that ten years ago, I suspect it was around ten years ago, we didn't even have the laws that said the contaminants that are out there were bad, or such as minerals, you know, where they'd come down reasonably, as far as nickel quantities being harmful, so therefore, you've got to clean up that site. There's nothing to say that five years down the road that even the acceptable levels now have got to be cleaned up, so therefore, you know, what businessman in his right mind would put himself into a building, even if it was the Taj Mahal, on that ground out there, knowing that there could be potential problems in the future where he'd have to move or get involved with cleaning up. So, therefore, that's a deterrent for anybody to want to get into that building.

As far as the building's condition, it wouldn't be in the sad shape that it is now if a normal company would have just moved out and another company have moved in, and it sat there because nobody was allowed to repair it and keep the maintenance on it, so therefore, it has become a shamble.

So, therefore, if Barnwell County, or if anybody--I mean, if they do decide to make that another industry, a manufacturing building or area, it will probably sit there like another unused building because of the liability issues.

MR. JAN ROGERS: From Superfund--lacking re-authorization, Superfund is a law, like a lot of environmental laws today, are passed with sort of some drop-dead dates on it. Congress gives them about a five-year life and has to re-authorize them over time. In our case, it's very necessary because our funding is based on a five-year funding mechanism. Actually, which doesn't exist right now. But there's a lot of debate over re-authorization and making Superfund more fair. It's a retroactive liability law; a lot of people have a lot of problems with that. And they have a lot of problems with all the other liability issues, the joint-and-several, one person can be held totally responsible for all of it; new owners, a bank comes in, deep pocket, we can go after them if they took ownership of the property.

In the interim of re-authorization to straighten all that out, because we can't change what the law says or how it's interpreted, but we can--we've implemented some of what we call reforms that basically say, "We'll give out perspective purchaser agreements," where, in essence, we're saying, as an agency, "We don't think the law was ever intended to go after a new owner who wants to come in and reutilize the property under certain circumstances. We certainly won't give that to the people who did it, but a third party, sort of the Brown Field scenario, where there's an encouragement of industry to go in and redevelop what otherwise looks contaminated, a lot of that has been cut off because of the broad-based liability associated with Superfund.

And there are some ways today to shield that liability and encourage people to go in and do that. This administration, through the reforms and other things they've done, in interpreting the Superfund legislation, has tried to help stimulate that. Not just on Superfund sites, but there are sites that are going to drop out of our domain in Superfund that are still slightly contaminated, that local government wants to encourage reuse of. Most people said, "We don't want to touch it because of the liability questions." Those are getting straightened out, for the most part.

The other half of your question I thought you were headed toward, which you really didn't go there, was suppose environmental standards change in five years. Good choice of time frame. Part of the Superfund program, or process, is we're going to clean it up. If we leave any waste on site that causes the site to have a restricted use of any nature, such as if we bury things and leave them there, there's a restricted use. It causes a reevaluation of the site every five years to assure that it remains protective of public health and the environment. As long as that site, when it's cleaned up, is left in a condition that is not--I forget the wording in the law, but basically, it talks at the issue backwards. If the site is left in any condition that does not allow it to have completely unrestricted use, then you have to continue to do five-year reviews throughout the life of the site until it does reach a state where there's unrestricted use.

Groundwater, that makes sense. Groundwater, ultimately, will be solved. And when it's solved, there becomes an unrestricted use, and therefore, you wouldn't necessarily need to continue to review the site from every five years after that.

If you bury things, you're looking at perpetuity, Every five years, you're going to go back, reevaluate. Part of the reevaluation is let's look at any toxicological changes related to these materials; have we progressed in our understanding of toxicology that we think this stuff is worse than it was, and the numbers that tweak how clean is clean drop to lower levels that might cause us to go back there and reevaluate additional cleanup.

So there's a process in there to make sure that if something is left on site, it's not left for the local community to be burdened by, it's basically left for the responsible parties to deal with. And it's monitored as long as necessary until there's completely unrestricted use of that property.

And, you know, the contamination, you

have to realize, is behind the building towards the wetlands and off to the side of the building towards the wetlands, and in the wetlands. That's not the ideal part of the property to try to utilize, whether it's industrial or goes recreational. There are concepts that could be contrived where it could be done in such a way that it could be left safe and not interfere with recreational use because you've got a lot of acreage out there not necessarily causing a great deal of utilize that acreage that's tucked up right against the wetlands, and, in fact, you may have problems doing too much over there because you could cause an adverse impact to the wetlands; sediment runoff and a number of other things.

MR. W.A. GRIPP: So, basically, what you're proposing is, then, clean the site, possibly keep whatever is on the site, the contaminants that you can, and hope that it could someday be used for an industrial park, or an industrial area?

MR. JAN ROGERS: Yeah. We're trying to do it in such a way that we don't interfere with it being used for industrial, or if you want it to convert to residential or recreational, we're trying to do it in such a way that it would not impair that use.

MR. W.A. GRIPP: Has the EPA the authority--

does that building impact the EPA's decision at all?

MR. JAN ROGERS: Only in the--

MR. W.A. GRIPP: What would it have to do to impact the EPA's decision?

MR. JAN ROGERS: Well, only in the--well, it only impacts us from the perspective of considering future use, of what's a reasonable assumption of future use. This is crystal ball stuff, what's a reasonable assumption.

MR. W.A. GRIPP: Right, and I understand that. And that's where I'm going. Okay, therefore--now, I know I visited that site with Sheri and so on, but have you had an engineer, or someone with economic development, or those specialty fields, look at that site? Realizing that we give property away at the industrial site, now, that's uncontaminated.

MR. JAN ROGERS: We're not economists.

MR. W.A. GRIPP: It is there for the taking, bring your business and bring it to Barnwell, and here it is.

MR. JAN ROGERS: Yeah. And we're aware of that.

MR. W.A. GRIPP: Now, has anyone been contacted from any of those fields to take a look at it from a development standpoint, of what future use, or is that just a judgment call from--

MR. JAN ROGERS: Who did we have out there?

MS. PANABAKER: Richard.

MR. JAN ROGERS: Okay. We specifically made a trip down to look in the building to determine is it a dilapidated falling-down building that's a hazard to the public, or is it just a building in ill repair.

MR. W.A. GRIPP: And that was that gentleman from DHEC?

MR. JAN ROGERS: Yeah.

MR. W.A. GRIPP: And is he an engineer, or--

MR. JAN ROGERS: Actually, he's an engineer, but that's not his profession as far as--

MS. PANABAKER: But he's not for examining buildings.

MR. JAN ROGERS: Building integrity is not, you know, his profession. You know, the whole issue of future use is a gut call. You try to weigh all the positives and negatives.

MR. W.A. GRIPP: If Barnwell County were to hire a person, or whatever, to take a look at that to represent Barnwell County as to meet with our economic development people, the Tri-County Alliance, and a specialty outside of the Barnwell County, would you accept a recommendation from them?

MR. JAN ROGERS: No. Because, to some extent, it becomes bias, but that's not really the main reason. There's just as hard, as difficult an ability to view a real demand for the property for residential. We've had those discussions internally. We don't see that going residential. Ballpark makes some sense. Recreational, maybe, if there's really a demand for it. But, you know, it's at tough issue of cutting, you know--us going out--we take on some personal potential liability of going out and saying, "Well, we think it's a good idea, let's just go out and knock the building down and deal with that." It's not a contamination problem.

MR. W.A. GRIPP: Well, that's why I'm saying an independent, an independent agency take a look at that and give a recommendation, if that is their professional forte.

MS. PANABAKER: One other main point, though, when we're picking between residential and industrial, a resident is saying there's a child under six sitting in the backyard every day, X hours a day, eating X dirt. You don't have that same child doing that at a ballpark. The kids do not go to the ballpark every single day, sit six hours in the dirt and eat whatever. So--

MR. W.A. GRIPP: But right now, I'm talking-- right now, I'm just talking about the building issue.

That's why I'm asking if you would entertain a professional with that's his forte to investigate that, and would that have any impact on the EPA agency?

MR. JAN ROGERS: Well, it would be additional information we would consider. It wouldn't drive the decision necessarily.

MR. W.A. GRIPP: Well, I'm not say drive the decision, but at least that you could look at.

MR. JAN ROGERS: Yeah. Because; you know, I'm going to sit here and say, well, you wouldn't like it as a community, maybe, but somebody might come in here and want to use that just to store junk, or close to it, because you were willing--

MR. W.A. GRIPP: I'd like to know who that somebody is.

MR. JAN ROGERS: Well, no, because you were willing--my guess is it ends up in your hands for tax default.

MR. W.A. GRIPP: It does.

MR. JAN ROGERS: And you were willing to give away the property if somebody was willing to come in and fix up the building and turn it into some useful purpose. They're not going to put a lot of money into it, maybe, but turn it back into a useful purpose, you may cut that deal. You know, there's a lot of what-ifs that we could get into, and scenarios. It makes it very difficult to deal with--

MR. W.A. GRIPP: Well, my only question was, sir, would you consider that fact from an independent?

MR. JAN ROGERS: Sure.

MR. W.A. GRIPP: Not from Barnwell County, not from---I'm just saying an independent that that is his forte; that building, what future use you could have.

MR. JAN ROGERS: Okay, the problem is, all that does is change our cleanup goal. We're still not going to knock the building down. So--and Sheri's best guess is it probably--you know, it's a best guess. Even if we drop the cleanup goal, which is predominantly lead, from 1150 to 400, we're not talking a lot of extra volume.

MS. PANABAKER: It doesn't change how we clean. up the site, it just changes a little bit of soil. A little bit more soil might be picked up.

MR. JAN ROGERS: Yeah, it just changes the amount of soil we have to address and what concentrations we leave on the surface, a difference between 1150 and 400, maybe. Even if we chose to say, "Okay, this makes sense," and I'm not sure 400 is a good number for recreational. That's a residential number and those are calculated based on realistic--well, realistic guess of what's a rational exposure frequency. Recreational people are going to be out there maybe an hour or two, two or three times a week, but that's different from a child playing in the back yard type thing.

And typically, children playing in the back yard, to be most conservative, we look at zero to six years old. Most six-year-olds, you may see at the ball park, or recreational park, but you won't see two-year-olds out there a lot.

So we would have to recalcuate even for recreation on what would be the cleanup goal. It would only change how much soil needs to be dealt with and what would be the residual. The residual contamination left on the surface around the site that wouldn't be dealt with. It wouldn't change the idea that some of it could be left on site. But we think we structured it in such a way that the stuff to be left on site is relatively non-imposing. The stuff that would be left with basically just a cover isn't much of a threat to public health, it's really a threat to groundwater.

MS. ELLEN FITZENRIDER: I'll give Bill a chance to catch his breath. My name is Ellen Fitzenrider. I am a chiropractor here in town. I'm also the chairman of the Board of Directors of Chamber of Commerce. I am also in the process of organizing Barnwell County's first Earth Day this coming April.

And first, I'd like to address a comment that you made. Barnwell County residents know all about the not-in-my-back-yard syndrome. We've got SRS here, we've had Chem Nuclear here. Chem Nuclear is a facility that was, built for what it does. It's a containment situation. It's regulated and it's there. And I get newspaper clippings from my relatives up north about this radioactive waste in the Barnwell dump. Well, it's New Jersey's low level radioactive waste that is being sent here. So we know what it's like to have something in our back yard.

MR. JAN ROGERS: Yeah. Actually, it shouldn't be New Jersey's, but it takes the Southeast compact.

MS. ELLEN FITZENRIDER: I've heard that they have received other than up in the northeast, where there's a place in Oregon that they have gotten stuff from; other places, but just as an illustration.

I guess the cap you're talking about is a cement cap, something--

MR. JAN ROGERS: No, it could be earthen.

MS. ELLEN FITZENRIDER: Earthen?

MR. JAN ROGERS: Just basically to take away direct contact.

MS. ELLEN FITZENRIDER: So, for example, this arsenic and lead that's in the soil, how long will it be there underneath this earthen cap?

MR. JAN ROGERS: Some of the arsenic is there naturally and it'll be there indefinitely because metals, they don't break down.

MS. PANABAKER: But it'll be treated with the solidification process.

MS. ELLEN FITZENRIDER: I'm not too familiar with those metals as far as what Shuron was using it for, but for example, 30 years ago, they were using arsenic in pesticides. That was very common. And there is soil in Blackville that is so contaminated from pesticides from 30 years ago that they can no longer grow anything on that soil, period, forever, because it will always be there. And any decision we made now where that stuff is going to end up, it's going to be there, and if we change our mind as to what we want to use that site for in 75 years, when your grandchildren are expanding cut in that area, they'll have to deal with it then.

I have also talked with the Economic Development Commission here in Barnwell and they had at one point met and discussed possible uses for the building out there, and it was their--and you all know that they've done well in expanding the facilities and plants and bringing new business to the airport industrial park, and it was their, I guess, decision, or conclusion, that the Shuron building was not in the type of shape that they could readily rent it. There was asbestos also in the building, and it's an awkward size and it just was not rentable or usable to their standards. They're expanding out towards the airport. I don't know if anybody was aware of that.

I've been living in Barnwell now for almost seven years. I've seen residential areas being expanded out that way, I've seen residential areas expanding that way, industry is going that way, and it's growing. A few years ago when all the layoffs hit SRS and everybody panicked, we thought, "What's going to happen to Barnwell County?" Well, it's kind of nice down the road to see what has happened to Barnwell County, and all the things people were afraid about didn't come to pass. We've gotten businesses. Now, the SRS is talking about other things, but we are growing and we'll continue to grow and expand, and we're heading that way. And that site's not that far out of town. It's around the corner from Reid's.

In this booklet, you also mention something about--I'm trying to think. I'll tell you what, I'll finish off with something else I wanted to, and if I remember anything else, I'll just raise my hand again.

MR. JAN ROGERS: That's fine.

MS. ELLEN FITZENRIDER: Just a personal comment that many native American religions, I guess, or beliefs, base their actions on the fact that--consider all your decisions on the impact it will have for the next seven generations to come, and some, they say, forever. And I don't--I guess I'll leave it at that.

MR. JAN ROGERS: To talk about the metals issue, the metals are there. Arsenic in a naturally occurring metal. Probably not in the form it's in. I believe it's related to buffing compounds they used in some kind of a salt. But they don't go away. Typically, the technology used is to immobilize them, make them unavailable for exposure, and the simplistic technology is probably more understandable cementation. We call it solidification, fixation. You can get real sophisticated, you can do all kinds of things, but if you put it in cement, generally, it's made unavailable for two reasons; most metals, other than sodium, tend to not be very water soluble in a very alkaline environmental, which is what cement is.

So it works very effective, even for metals that tend to migrate in a soluble form, such as certain forms of chromium. And because it is solidified, typically, it would not be left on the surface, it would be solidified, subsurface covered, and that sort of gets into the issue of how much engineering do you throw into your cover. It's based on what did you put there in the first place.

You know, years ago, the technology was dig a hole in the ground where it looked like there was a little clay and bury your waste. Some sort of landfilling was related that way, too; for our domestic waste. Things evolve. Even domestic waste landfills are now seeing liners and other things put in them because of the lack of control of what goes in there.

Typically, we're going to put fairly high engineering controls on anything we put on site, but if you look at the remedy, it's structured such that if it's truly still hazardous; whether you treat it or not, if it's a hazardous waste by definition of environmental law, it's going off site. The only thing that would stay on site is something that no longer is a hazardous waste, but still poses a potential hazard. Which you're talking about relatively low concentrations.

And the hazard typically is oriented towards its leachability and it's ability to adversely impact groundwater. The way we structured this is that site has groundwater to about three to five feet. It's readily impacted by anything that leaches. So anything in the treated or even the natural state after it's excavated that leaches above drinking water standards, we said you would have to put in engineering controls and, in essence, encapsulate it in an envelope to leave it on site. That's not a desirable thing to do, and it's a pretty expensive thing to do for smaller volumes of waste, which drives the issue of economic comparison to off site. That waste can be taken off site to appropriate facilities and landfilled where they're monitored and they're checked and they're watched and they're supposed to take that kind of waste.

But we still have to look at cost. There's a balance here of optimization between cost and making sure it's protective. Either way, it's protective, but we would also look, and I think even the responsible party when they were doing it would look at long-term cost's. If you it-on site, you've got to monitor it a long time. You've got to spend a lot of money doing that. If it's cheap to go off site, we've left the door open for it to go off site even in a treated form. Even if it--well, at least if it doesn't leach above MCLs, or drinking water standards, there's really no reason for it to go off site, but even that's open. I realize off site can be expensive. The disposal fees off site have been dropping. Just as unemployment probably went up with the changes at Savannah River, things change and, suddenly, you don't necessarily see that impact.

Disposal fees for hazardous and other waste have been dropping in some regards because of the lack of volume. A lot of the environmental programs are oriented toward giving industry incentives not to generate the waste today. That doesn't solve the problem with that past, but at least you have less generated. If you have less generated, you have less going to the facilities that were set up to take it, and they're still in business, trying to stay alive, and they'll drop their price to get more volume to deal with the economics of the situation.

Those are things we don't know. We don't know what it'll be two years from now. Neither does the responsible party. We're tasked with creating a remedy that is sound for protection of public health, considers both on site, off site, considers future use as to how clean is clean, and considers the economic part of it because, in theory, the Government could be building this, too. We don't anticipate that at this site, but in theory, the responsible parties can back off and say, "We don't like your remedy, you build it," and suddenly, we have to use Federal money to build the same thing. We want it to be cost effective and protective, and it creates the tug and pull of balance between how much stays on site and how much goes off site and how do you deal with those issues.

From a public perspective, it tends to get emotional. The public would always like to see all of it elsewhere. That's a normal response. And I've only seen that occur once where somebody actually--a public group stood up and Said, "We don't want you to take it to somebody else's back yard." Never happened more than once that I know of.

But these concentrations we're talking about are low. We're not talking about hot waste, we're talking about residuals. Anything hot is leaving anyway. And you're right; go out in the fields and you'll find arsenic if you sample because it was used as a pesticide. And so you have, in essence, background levels or arsenic, which also creates a problem of, in other cases, where a risk would suggest clean up to a certain level, but that level is below background. You cannot clean up below background. You don't know where to stop.

So, you know, there's a number of considerations we have to make in figuring out the best solution. We do want to hear the public input, and we do consider all that input and, in fact, we'll try to finesse it as much as we can, but we do have some barriers in that we don't have to authority to go out and, say, knock down a building unless it were a chemical problem, which we don't really see that.

So changing the use only changes how much we clean up, and it really doesn't necessarily change--we give some consideration, but we still look at the economy as a scale.

MR. W.A. GRIPP: And I just go back to dollars and cents and that issue, that that is a major obstacle in that future use of that property is questionable, and what can we do with it? And also, I understand that you have the contamination concerns, as well as we do, but the cleaner that site is, the more options Barnwell County will have to develop that for future use.

MR. JAN ROGERS: That's true, but some of it's stigma and it's hard for us to deal with that.

MR. W.A. GRIPP: And because of that stigma, that's why I'm saying that it's probably not going to be an industrial park.

MR. JAN ROGERS: Oh, I know. You know, the problem is you've got a building there. You know, the majority of that property could be turned into a recreational facility tomorrow. There's a big chunk out in front of that building and it could be kept separated, so, you know, it's not undoable.

MS. GALE KROGH: Would you like it in your little town?

MR. JAN ROGERS: Pardon?

MS. GALE KROGH: Would you like it in your little town?

MR. JAN ROGERS: Some people have it in their little town.

MS. GALE KROGH: I didn't say that, I said would you like it?

MR. JAN ROGERS: It doesn't matter. Like I said, the normal response from the public is, "I don't want it in my back yard." That's a proven response, and that's an understandable response. But we've got to weigh all the considerations. We can't say, at any cost, take it elsewhere. And if you run the economies right now, taking it elsewhere is significantly different in cost.

MS. PANABAKER: No, they're about the same right now.

MR. JAN ROGERS: In some scenarios, yeah.

MR. W.A. GRIPP: There are areas, landfills, for exactly that purpose, to take those contaminations.

MR. JAN ROGERS: Another--

MR. W.A. GRIPP: But I don't want to take up somebody else's--

MR. JAN ROGERS: Yeah, if you--let me get one other theoretical issue in here. To a responsible party, they sometimes raise the question of, "We don't want it going somewhere else because of Superfund liability. If you take my waste over there and that site goes bad five years from now, I'll be in one heck of a litigation battle over something I had no control of and may not have event contributed to, but somebody will have a record my waste went there." And that's a very difficult factor to weigh into cost--economy is a scale on cost balancing. But that's another factor that most people will overlook. You take it somewhere else and it's not like there's ever been--there's never been a RCRA facility that didn't go bad. There's a few notable ones, actually, around.

MR. RONNIE RUTHERFORD: I have a question about the building. I've never been in it and don't know the condition or the size of it, but say for worst case scenario, we decide to turn it in to, like, a recreation park with a skating rink, bowling alley, putt-putt golf course, or--is it feasible that the building could be used for something like that for use in the town, or--I don't know, I've never been in the building.

MR. JAN ROGERS: Yeah, the big debate right now seems to be that it's going to be--the roof leaks. It's going to be fairly expensive to fix the roof, is what we heard from a quick look.

MR. W.A. GRIPP: It's been gutted and the roof more than leaks.

MS. PANABAKER: Buildings can all be fixed, it's just how much money. If it turns out it's cheaper to knock it down and build a new one than fix the one you have, but I don't--we can't--we don't know.

MR. RONNIE RUTHERFORD: Well, that was my next question. Is there enough area left, if you didn't use the existing building, to could build in front of it, maybe a bowling alley or skating rink or something like that that could be used for the teenagers in town, a place of them to go? Is that a possibility?

MR. JAN ROGERS: There should be a map in here that shows the property. It's a pretty good chunk of property out in front of it. It gets a little odd with-- I mean, it basically makes the building totally unusable if you do that in some scenarios, but it's certainly better if the building is not there, but there's a big chunk of property out there.

MR. RANDY REECE: Randy Reece from Barnwell High School. As far as the cleanup goes, who covers the cost for that?

MR. JAN ROGERS: Superfund has a trust fund that basically is there to allow the Government to clean up sites. But the thrust of the program is toward trying to find the people who are responsible for the liability associated with the cleanup, as is the way the law is worded. It's basically owners, operators and any transporters who had anything to deal with generating or carrying the waste there. We go to them and basically try to enter into agreements whereby they do the work. Now, that's what happened on the front end of this; they actually did the studies, but they didn't just do them on their own, we basically oversee it, review it and direct it, make sure it suits our needs as far as being unbiased and a true evaluation of the problem at the site. But it's their money paying for the work.

And then, when we sign the record of decision, which will lay out, "This is what we think needs to be done at this site," we'll re-enter negotiations for the responsible parties to implement the work. They can enter into an agreement to do that, or they could decide not to; we would go build it and then pursue litigation to recover those monies.

And the trust fund is really not even taxpayer money at that--initially. It's tax on industry; it was until it lapsed. So the original trust fund that runs the program is generated by a tax on the industry that typically deals with the kinds of chemicals that creates hazardous waste problems. We feed off of that money to run the program and implement the program, but we also try to get enforcement first and get the responsible parties to do as much of that under orders and agreements.

MR. RANDY REECE: As far as what goes there, I'm president of FCA, Fellowship of Christian Athletes at Barnwell High School, and I go to a lot of students' houses and talk to them, the ones that are having troubles and stuff, and supposedly 75 percent of them say that their lives would probably be different if there was somewhere in Barnwell to go because people don't have transportation or, for some reason, can't get out of town to go to, like, Aiken or Augusta, and so they say that they don't think they'd be as troubled if they had something to do because, when they don't have something to do, they go off with the wrong crowd and do some things they shouldn't. So I do think it'd be a pretty good idea for a recreational facility.

MR. JAN ROGERS: Like I say, we have no reason to oppose that, and any implementation would be--we would attempt to do it in such a way that it shouldn't hinder it, as best we envision what we would do today.

MR. WENDELL GIBSON: You mentioned awhile ago that there was different standards--I'm Wendy Gibson, I live on Camelia Street right near the site.

MR. JAN ROGERS: All right, finally somebody that lives near it.

MR. WENDELL GIBSON: You mentioned that there were different standards for residential and recreation.

MR. JAN ROGERS: Well, it's not a standard, per se. There's very few regulated standards on what's acceptable exposure. Most of it relates to drinking water; that's a well-known issue. When it comes to soil and consumption and exposure to solid type material that's potentially a hazard, the methodology is what we call risk assessment. You figure out the exposure mechanisms, the paths by which it would be absorbed and dosed; you buy the material, you figure out what is a realistic dose. You go out and take 100 samples, it'd be 100 different concentrations. You've got to use some statistical averaging and other things and come up with what's a reasonable expectation for the activity that occurs there.

And what we typically do is look at a lot of them. We'll look at residential, which typically, the most extreme residential is a zero- to six-year-old child in the back yard playing in the dirt, and there's known effects of how much soil they tend to consume in that activity.

Industrial, you've got workers there eight hours a day, or ten hours a day, wandering the place five days a week, doing something outside. So, there's different assumptions on some of the factors that create the exposure. That has to be considered to figure out, first of all, how much are you being exposed to so we can calculate the equation to say is it an unacceptabie risk based on the chemical's specific nature of exposure.

Once we determine it's not acceptable, you've triggered Superfund response, and in order to figure out what is acceptable, we tend to put in what is the goal for risks, an acceptable risk, and back calculate to a concentration that you would have to clean up to. And that's where you see, quote, the standards-- they're not really stadards, they're calculated numbers to determine how much would you have to remove in order to make the site safe for the expected use.

MR. WENDELL GIBSON: There will always be zero- to six-year-olds sitting on the sidelines eating the dirt while their older siblings are out taking part in the recreation at a ballfield, something like that.

MR. JAN ROGERS: Sure, but they're only there two or three days a week, maybe. I mean, if it's a child, we're going to put them in the back yard seven days a week at a residence, so it does change the amount of exposure and, therefore, the amount of chemical they're exposed to because of the frequency.

MR. WENDELL GIBSON: Now, they say that the roof is leaking now.

MR. JAN ROGERS: Yeah.

MR. WENDELL GIBSON: If we go through with your choice and your preferred method of dealing with this, what time frame are we looking at before it may be used for, say, as an industrial site in the future? What--do you have a proposed time frame for the cleanup period?

MR. JAN ROGERS: We really avoid giving out those kinds of answers because we're always wrong.

MS. PANABAKER: I've learned that.

MR. WENDELL GIBSON: I'm only saying that whatever it is, perhaps the roof caves in by that time, which the demolition costs, most contractors will tell you that it would be almost as physically achievable to build a new building rather than go in and take one out and start over, and so, you know, what's the--why are we trying to save this dilapidated 40-year-old building with the leaking roof?

MR. JAN ROGERS: We're not trying to save it so much as we're saying the building is there. The building is an impediment to recreational use in some ways. If you want to use all the property, the building's in the way. And nothing we're going to do from cleaning up the site should have us over there removing the building, as best we understand it today, because it's not a chemical problem, it's a derelict building problem. And local governments deal with that somehow, someway, and I'm sure there must be Federal money, which we've--you know, we've tried to give some ideas of places to look.

We're not against the building going away, but it gets down to what is a reasonable future use. Recreational has some merit, but the building sort of impairs that. And we don't see the building going away, and we're not going to take it away, and we can't order the responsible party--in our mind, we don't think we should be ordering the responsible party to do it because it's not a chemical problem.

MR. WENDELL GIBSON: It's going to fall in sooner or later.

MR. JAN ROGERS: There will be other buildings in Barnwell that do that same thing that have to be dealt with, probably, is my guess.

MR. RONNIE RUTHERFORD: Well, what I was going to say is like Ellen said, 75 or 100 years from now, it's now going to be turned into a residential area, so why not go ahead and clean it up like it's going to be residential to start with?

MR. JAN ROGERS: Well, if we clean it up and leave anything on site, we'll leave D notations such that, in theory, people trying to convert it to residential will know that it's there and shouldn't be, but it's not our plan to restrict use of property. We don't know what 100 years will be like. There may be a tremendous demand on property around here 100 years from now and somebody might want to pay the difference to clean up the difference to make it residential.

MR. RONNIE RUTHERFORD: That's what I'm saying, while you're getting the cost from whoever's--like, Shuron, if they're liable, or whoever--

MR. JAN ROGERS: They're not liable for that. That sounds like a free ride.

MR. RONNIE RUTHERFORD: Okay, whoever is liable, in other words, while you're getting the cost to clean it up, go ahead and get it cleaned like it should be instead of paying 10 times the cost 20 years down the road.

MR. JAN ROGERS: Okay, but you're saying it should be residential. What we're saying is we have to make an informed decision about what's the realistic--I think this real terminology, the reasonable future use scenario.

MR. RONNIE RUTHERFORD: I would think, over the years, like Ellen said before, 50 or 75 years down the road, there's a good chance it would be residential out there.

MS. ELLEN FITZENRIDER: In fact, that road, that's the only industrial site. Everything nearby is all residential around there.

MR. JAN ROGERS: It would be a county maintenance area, too.

MS. ELLEN FITZENRIDER: As opposed to other areas that's--

MR. W.A. GRIPP: I don't want that. I've got enough contamination.

MR. JAN ROGERS: I mean, you know, this is cheap property. I can see some things going on here. No, you know, there's no problem with people coming up-- you know, anybody can come up with that scenario. It's just--it's very difficult for us to jump and say, "We're going to make somebody who's responsible for the chemical problem do certain things that are niceties for the community.

Now, the fact of the matter is, you know, we get out there and they may be willing to do some of that. I don't know. They won't commit to it, I'm sure, but it's our feeling that the difference is a relatively small volume, and if it were a relatively small volume--

MR. W.A. GRIPP: Well, I think that's a very major barrier in this whole thing.

MS. ELLEN FITZENRIDER: Didn't you say at the beginning that the cost of removing everything is about the same as what your proposal is?

MR. JAN ROGERS: Yeah, but these numbers are pretty soft. I mean, they're--

MS. ELLEN FITZENRIDER: Well, more or less. It's not like you're asking them to spend three times as much money as--

MS. PANABAKER: But it's like he talked about earlier, we don't know what the liability would be if they take it somewhere else.

MR. JAN ROGERS: Yeah, and, see, that's the thing we can't write off.

MS. PANABAKER: And we've left it both ways to figure it out better when we're actually doing the cleanup and we actually know the volume of soil. We're guessing on the volume now, we're guessing what it would cost to go off site, we're guessing what it will cost to solidify it. There's nothing written down, "This is my fixed price bid, I'm sticking to this no matter what." So--

MR. W.A. GRIPP: And also, the Three Rivers landfill that will be opening up, those are not fixed price right now. They are for the member counties for household waste, but not--not for any type of hazardous waste.

MR. JAN ROGERS: Yeah, that'll always fluctuate. And that won't be hazardous, it'll just be industrial waste, won't it? They're not hazardous waste landfills, are they, per se?

MR. W.A. GRIPP: No.

MR. JAN ROGERS: They're industrial, at best?

MR. W.A. GRIPP: Right.

MR. JAN ROGERS: And, you know, that's--the law is there to create a cleanup of problems that occurred in the past that weren't illegal. Generally, there's--you know, there's a lot of these things around the country. The law is there to clean them up and restore them to a protective level for the public. Where it gets into the big debate is what's the future use. Future use can be debated a long time and, you know, people will take positions. You should have heard some of our internal discussions about this site. You've got a new industrial park. You're not going to push anybody over towards that building.

MR. W.A. GRIPP: Hell, no. why would you?

Sir, have you visited the site?

MR. JAN ROGERS: Yeah. Haven't been in the building,itself, but I've been around the building. And, you know, I've seen the area. I want to come back and look at it some more, but the--

MR. W.A. GRIPP: I'd be more than happy to take you through a tour.

MR. JAN ROGERS: Well, Sheri wants to, too.

MR. W.A. GRIPP: Okay.

MR. JAN ROGERS: But you ought to think about that. That's a good county maintenance yard area.

MR. W.A. GRIPP: No, sir. Barnwell County has enough problems without taking on any more of EPA's.

MR. JAN ROGERS: Are there other--

MR. FLOWE TREXLER: Let me ask a question. My name is Flowe Trexler and I'm with the County Council. On your page 18 and 19, are those figures inclusive to go from one to seven and add up to 11.8 million?

MR. JAN ROGERS: No.

MS. PANABAKER: No, each one--read it down--

MR. FLOWE TREXLER: Oh, you've got to add each one--

MR. JAN ROGERS: No, no.

MS. PANABAKER: No, no. This is the cost for this remedy, this is the cost for this remedy. It just goes straight down the page.

MR. FLOWE TREXLER: Well, what I'm trying to decide, I don't know that I can read it well enough to say--are we talking about a 12 million dollar job, or are we talking about a 20 million dollar job?

MS. PANARAKER: The groundwater, you add it to the soil. If that was your adding question, yes.

MR. JAN ROGERS: Yeah, they're two components. Now just the soil, each alternative has different costs for the soils. Whichever one is picked has a cost. The groundwater--

MR. FLOWE TREXLER: Well, when are they going to move along and make a final decision?

MR. JAN ROGERS: Pretty soon.

MR. FLOWE TREXLER: Then you can get around to Wendy's thing of the time when you're going to get it done, then.

MR. JAN ROGERS: That's right. Yeah, I need to go into that. I'll give you a general concept of it, which we're trying to speed up, because it's so embarrassingly slow. But the remedy is, what, in the 12 million range?

MS. PANABAKER: The soil part.

MR. JAN ROGERS: The whole remedy is where?

MS. PANABAKER: The whole remedy is--let's see, soil is 11 to 15 and the groundwater is two and a half to five.

MR. JAN ROGERS: Yeah. The two and a half to five is a broad range because it could go a long time, or it could go a short time. Changing the time changes the cost. But you're talking 15 million dollars which is not just, you know, pocket change for a little site.

MR. W.A. GRIPP: And an awful large corporation.

MR. JAN ROGERS: Yeah, well, we're not allowed to use that factor. It could be the Government paying it, although we'll sue them and spend three times as much getting it back, but--in litigation costs.

Time line; we sign a record of decision. We'll go out with a notice to the responsible parties, which, in this case, is pretty much Textron, and basically notice them that a decision has been made, we want to enter into negotiations for them to do the-- implement the remedy.

Depending on how we do that, we could do it with a unilateral order that might get them started quicker versus negotiating a consent decree, which the system does allow for negotiation with consent decree. That's not necessarily advantageous in all cases, and we can't make them sign a consent decree, so some of the things we're doing in the program now is trying to find ways to issue the order and give the opportunity to negotiate consent decrees at the same time so we can move the work forward.

But, in essence, what you--that usually takes up to six months, and in a real bad day, it takes a year and a half. So, that's something we're trying to work on, is not so much down time for negotiations versus get them committed to doing it, or else we're going to commit to do it, and get somebody tasked with starting to design it out.

The design phases typically takes a year because you do have to go back and do some field proofing of the data, make sure things haven't changed, now that you've honed in on a specific remedy. In this case, we've suggested treatment. There needs to be some treatability studies, bench scale and otherwise, to look at how successful would they be at immobilizing the leachability of these compounds.

So, you know, those things have to be done. This isn't just design like design a building; this is do some additional finessing of the remedy that's now selected, and then design how would you implement it, which starts to give you the footprint of where would you place it, how much of a footprint is it going to create on the property.

To some extent, that's still a challenge, though, because we've made this a three-tiered system. If it's still hazardous, it's out. We don't know how much of it is still hazardous till after you dig it up. The stuff you treat, if it comes in at one treatment scheme, you've got to build a Subtitle D facility to leave it on site, or pay to send it off site. Those are pretty realistic options when you're, you know, from a technical field perspective and spend the money.

And if you can treat it down to causing no threat, to groundwater or anything else, you might consider leaving it on site. Nobody is going to know what those volumes are without doing a little more coring and sampling and treatability studies. And even then, it's a guess. Until you dig it up, you don't know.

And another thing that our division director has already mentioned is don't implement anything that creates a big pile and leaves it there for awhile because the community will go crazy. So, you know, the design phase has to consider a lot of things of the logistics of how do you do this and get it done appropriately when there will always be a certain amount of unknown about the volumes you're going to deal with until you dig it up and treat it.

MR. FLOWE TREXLER: Sir, if I'm reading you right, though, you're talking about two and a half years before you remove any dirt.

MS. PANABAKER: Probably so.

MR. JAN ROGERS: Possibly two years. Could be two years or more.

MR. FLOWE TREXLER: And it'll take you another year to clean the site up; you know, the building may fall down.

MR. JAN ROGERS:, Well, that's true. Then we'll have a hazard for the workers working out there. No. It--the building is sort of a separate issue. But no, realistically, it probably will be a couple of years before you see cleanup. We're going to try to find ways to speed that up, but if you look at the--even the recent history of the program, it will be a little while before you see people digging up soil and dealing with it.

Now, we'll still have monitoring, we'll still make sure it's not going anywhere and adversely impacting anybody. It's not really doing that at this point. Groundwater doesn't migrate quickly, so that's not necessarily a problem in the interim.

MR. FLOWE TREXLER: I came to this meeting tonight hoping that I was going to find out that y'all were going to start next month.

MR. JAN ROGERS: That's sort of like optimism. We'll work on that.

MS. PANABAKER: I used to have optimism.

MR. JAN ROGERS: No, we would like to be signing a ROD next month, but even that might be debatable. Public comment, what, closes--

MS. PANABAKER: The 4th.

MR. JAN ROGERS: --the 4th of February. We've still got to take all the comments, do a responsiveness summary and kind of--that all becomes part of the record, as to how we respond to the comments and the considerations and everything because we don't really--people go away thinking we just ignore the public comment. We don't ignore it.

MR. FLOWE TREXLER: Just joking, but you've got job tenure just on this one site.

MR. JAN ROGERS: No, no, this Congress wants to change that, too. No, that's not the goal, the goal is to get it cleaned up as quick as possible, and we're trying to do some creative things to get it done more quickly. But you can't just run out and dig either.

The reason our division director said don't put a pile there is because we did in another state at another kind of site, dug up an awful lot of soil and left a pile there, and it has created a huge number of problems for the last three and a half years. So, there does need to be some thought and work done in the design phase.

Any other questions?

MS. ELLEN FITZENRIDER: What type of hazard do you see right now, not necessarily groundwater, but with the marsh waters and the wetlands in there as far as downstream?

MR. JAN ROGERS: Snakes.

MS. PANABAKER: We have ecological cleanup numbers established for the wetlands to protect the flora receptors.

MS. ELLEN FITZENRIDER: I mean, I'm just curious as to what has been going on, or what type of impact has it had?

MR. JAN ROGERS: Have we actually seen an impact? I don't think we've--

MS. PANABAKER: I haven't seen one, no.

MR. JAN ROGERS: We expect there are concentrations of the polishing compound, which is mostly metals, are elevated enough that we'd propose taking a significant amount of the compounds out in the marsh out because they would be adverse to the community of organisms out there. But it's not like you see everything devoid of organisms.

The organics that are in the groundwater, there may be a little bit of leaching into the marsh at the fringe.

MS. PANABAKER: Well, in the source area, it's down below the water table, so that continues to leach into the groundwater; that needs to come out.

MR. JAN ROGERS: But interestingly enough, the organics have less impact, I guess, on the eco part than the metals do, in a theoretical sense. It's not like you can go out there and see dead animals or see impact. We don't see that kind of--

MS. ELLEN FITZENRIDER: Not any fish or anything?

MR. JAN ROGERS: No. I mean, she's walked the marsh, I haven't. I don't want to walk the marsh because I don't like snakes, and there are a lot of them in there.

MS. PANABAKER: Any more?

MR. JAN ROGERS: Yeah, why don't we go ahead and--unless you have some more questions, why don't we go ahead and cut off the formality of the meeting, and we're still here if y'all want to ask more questions informally or anything.

MS. PANABAKER: Thanks for coming.

[PROCEEDING CONCLUDED AT 8:32 P.M.]

C E R T I F I C A T E

S 0 U T H C A R 0 L I N A

BARNWELL COUNTY

I hereby certify that the foregoing Public Hearing was reported, as stated in the caption, by the method of Stenomask with backup and reduced to typewriting by me or under my direction; that the foregoing pages 1 through 69 represent a true, correct, and complete transcript of the proceeding held on the 22nd day of January, 1998.

This 27th day of January 1998.

<IMG SRC 98086Q>

APPENDIX B

STATE OF SOUTH CAROLINA CONCURRENCE LETTER
SHURON SUPERFUND SITE

<IMG SCR 98086R>

RE: Shuron Superfund Site - Record of Decision

Dear Mr. Hankinson:

The Department has reviewed the revised Record of Decision (ROD) dated June 11, 1998 for the Shuron site located in Barnwell, S.C. and concurs with all parts of the remedy, except for the Remedial Goal for lead contaminated soils. The Department has determined that an acceptable lead cleanup goal in soils is 895ppm. If the implementation of the remedy selected in the ROD does not achieve this cleanup goal, the Department may take a separate action to ensure the remedial goal is met.

In concurring with this ROD, the South Carolina Department of Health and Environment Control (SCDHEC) does not waive any right or authority it may have under federal or state law. SCDHEC reserves any right or authority it may have to require corrective action in accordance with the South Carolina Pollution Control Act. These rights include, but are not limited to, the right to insure that all necessary permits are obtained, all clean-up goals and criteria are met, and to take separate action in the event clean-up goals and criteria are not met. Nothing in the concurrence shall preclude SCDHEC from exercising any administrative, legal and equitable remedies available to require additional response actions in the event that: (1)(a) previously unknown or undetected conditions arise at the site, or (b) SCDHEC receives additional information not previously available concerning the premises upon which SCDHEC relied in concurring with the selected alternative; and (2) the implementation of the remedial alternative selected in the ROD is no longer protective of public health and the environment.

SCDHEC concurs with the selected alternative for contaminated soils and sediments consisting of excavation and disposal. All soils designated as RCRA hazardous waste will be disposed of at an off-site hazardous waste facility. Soils determined to be RCRA non-hazardous waste will be either treated onsite or disposed of at an approved off-site disposal facility. Soils remaining onsite will be treated using solidification/stabilization and aeration. Treated soils that do not leach above drinking water standards may be disposed onsite with an engineered cap. Treated soils that continue to leach above drinking water standards will be disposed of in a RCRA Subtitle D landfill to be constructed onsite. The determination of onsite versus offsite disposal will be made in the Remedial Design phase based on cost. All wetlands that require remediation will be restored.

SCDHEC concurs with all remedial goals for contaminated media except for the lead remedial goal in surface soils. The EPA has selected a remedial goal of 1150 mg/kg for lead in surface soil. SCDHEC has selected a remedial goal of 895 mg/kg for lead in surface soil using a different exposure parameter than EPA in the Region IV Lead Uptake Model for Industrial Exposure. However, SCDHEC feels that the selected remedy will be protective of human health after the full remedy is implemented.

SCDHEC concurs with the selected remedy for contaminated groundwater consisting of temporary extraction for dewatering of soils during source removal and for an additional four to six months after excavation. After the temporary extraction phase, a data gathering and evaluation phase will be implemented. If determined to be applicable, Monitored Natural Attenuation may be applied to the appropriate portions of the groundwater plume. Active groundwater treatment will be implemented for all remaining areas of contaminated groundwater. If Monitored Natural Attenuation is selected, a ROD Amendment or ESD will be performed if EPA or SCDHEC determines either is necessary.

<IMG SRC 98086S>

cc: Hartsill Truesdale
Keith Lindler
Myra Reece, Lower Savannah EQC
Gary Stewart
Richard Haynes
Yanqing Mo